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# ALBUQUERQUE DISTRICT WILDERNESS ANALYSIS REPORTS



1984

US Department of the Interior  
Bureau of Land Management  
Albuquerque District, New Mexico



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# ALBUQUERQUE DISTRICT WILDERNESS ANALYSIS REPORTS

1984

CABEZON WSA  
EMPEDRADO WSA  
IGNACIO CHAVEZ WSA  
LA LENA WSA  
OJITO WSA  
RIO CHAMA WSA  
SABINOSO WSA  
SAN ANTONIO WSA

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# APPENDIX A

WILDERNESS ANALYSIS REPORT

CABEZON WILDERNESS STUDY AREA

NM-010-022  
ALBUQUERQUE DISTRICT

RIO PUERCO RESOURCE AREA







## SECTION 1

## GENERAL DESCRIPTION

## LOCATION

The Cabezon Wilderness Study Area (WSA; NM-010-022) contains approximately 8,118 acres of public land, and is located approximately 15 air miles due west of San Ysidro, New Mexico. It is situated to the north of Mesa Prieta and to the northeast of Mesa Chivato, in the valley of the Rio Puerco (refer to Map A-1). It is bordered on the north and south by maintained roads, on the west by property boundaries and a maintained road, and on the east by a combination of a powerline right-of-way (NM-559354) and a maintained road (refer to Maps A-1 and A-2). The U.S. Geological Survey topographic map that covers this area is Cabezon Peak (7.5 minute quadrangle).

## CLIMATE AND TOPOGRAPHY

The Cabezon WSA lies within the Navajo Section of the Colorado Plateau Physiographic Province. The climate is semi-arid and the landforms strikingly reflect erosive processes associated with the arid cycle. Three principal landforms occur within the Cabezon WSA: (1) the eroded volcanic neck of Cabezon Peak; (2) the talus-covered slopes at the base of the neck; and (3) the incised mesa topography that characterizes the remainder of the WSA. The Navajo Section consists mainly of sub-horizontal sandstone beds with lesser amounts of shale that has been subjected to great erosion.

In addition to these landforms, the Navajo Section is characterized by numerous occurrences of volcanic necks, buttes, and mesas. Cabezon Peak, which rises to an elevation of 7,785 feet, is one of the most spectacular examples of these volcanic necks.

The relief is moderate throughout most of the WSA and results from the incision of numerous arroyos into the flatlying sandstone beds that surround the volcanic neck of Cabezon Peak. Areas of high relief are restricted to the upper slopes of the peak, where nearly vertical cliffs predominate.

The WSA exhibits a semi-arid climate. Warm, relatively dry summers and cold, relatively dry winters are characteristic of the area. The average snowfall in the area is more than 37 inches, occurring between October and May. Summer precipitation comes as violent convectional thunderstorms of high intensity and short duration. These thunderstorms are extremely unpredictable in their rainfall patterns, with certain localized areas receiving moisture while adjacent ones receive none. Average annual precipitation is approximately 11 inches. About 40 percent of the precipitation falls in July and August.

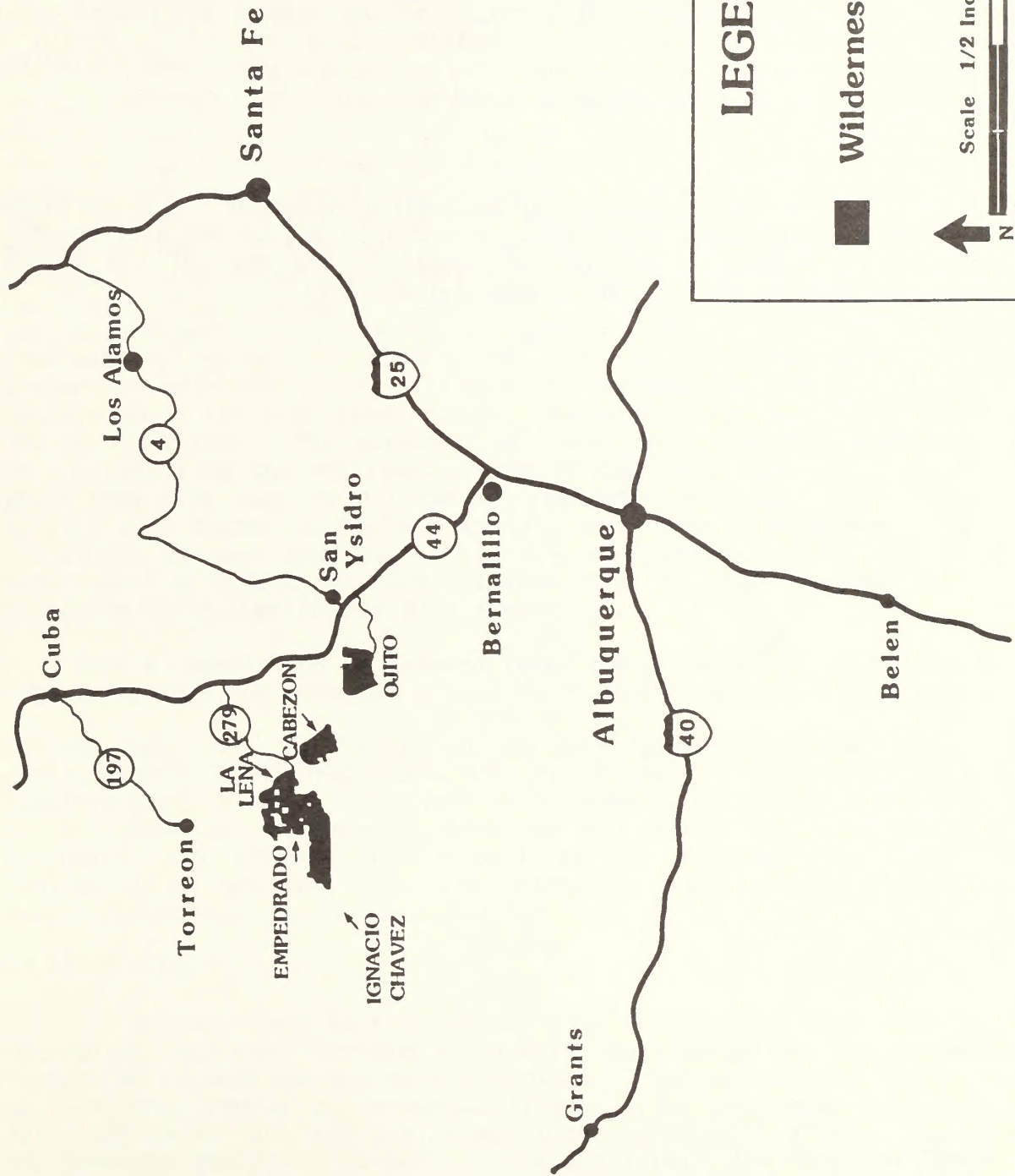
Temperature, like precipitation, is extremely variable from season to season. Extreme temperatures range from 102° F in the summer to -20° F in the winter. Average daily temperatures in the warm months vary from 45° F in April to 70° F in July.







# MAP A - 2 GENERAL LOCATION



The average growing season is approximately 160 days, beginning in May and ending in October. The full 160-day season is seldom realized because available moisture, rather than temperature, is the limiting factor.

#### LAND STATUS

The Cabazon WSA is made up of 8,118 acres of public land. The major portion of the WSA contains land acquired by the federal government under the Bankhead-Jones Act of 1937. The remaining acres are public domain lands. Twenty acres of private land to the north of the WSA were incorrectly included in the WSA in the intensive inventory and have since been removed.

#### ACCESS

This WSA can be reached by proceeding southwest off State Highway 44 onto a county-maintained gravel road, and then on maintained dirt roads to the north, east and south. Part of the access to the west of the WSA crosses State of New Mexico land (refer to Maps A-1 and A-2).



## SECTION 2

## EXISTING RESOURCES

## GEOLOGY

A discussion of the geology of the Cabezon WSA is contained in Captain C.E. Dottan's report of 1885. Dottan's discussion includes the following comments:

If we stand upon the Eastern Brink of Mount Taylor Mesa we shall overlook the broad valley of the Puerco (east). (The spectacle is a fine one and in some respects extraordinary). The edge of the mesa suddenly descends by succession of ledges and slopes into the (rugged and highly diversified) valley-plain below. The country beneath is a medley of low cliffs or bluffs, showing the light browns and pale yellows of the lower and middle Cretaceous sandstones and shales. Out of this confused patchwork of bright colors rise several...objects of remarkable aspect. They are apparently inaccessible eyries of black rock, and at a rough guess, by comparison with the known altitudes of surrounding objects, their heights above the mean level of the adjoining plain may range from 800 to 1,500 feet. The blackness of their shade may be exaggerated by contrast with the brilliant colors of the rocks and soil out of which they rise, but their forms are even more striking. It is rare to find such shapes in Plateau country, much more so elsewhere. It is obvious at once that these rocks are of volcanic origin; and the experienced geologist who has traveled much in these regions will recognize their significance at a glance ....

Hunt's description of Cabezon Peak, contained in his 1938 report on the igneous geology and structure of the Mount Taylor volcanic field, states:

Cabezon Peak . . . is the highest and most impressive of the necks, rising nearly 2,000 feet above the Rio Puerco, and the protruding basaltic core is about 1,500 feet in diameter...The...rocks intruded by the neck are Cretaceous sandstone and shale that dip gently northward, and although the contact is not exposed there is no indication of deformation by the intrusion. The exposed neck is nearly cylindrical and is about 800 feet high.

## ENERGY AND MINERALS

The volcanic neck that is Cabezon Peak represents a solidified column of once-molten rock that intruded through at least 6,000 feet of sedimentary rock layers as it made its way to the surface. These sedimentary layers range in age from Pennsylvanian to Cretaceous (Figure 1) and are known regionally to contain deposits of oil and gas, coal, uranium, copper, silver, limestone, gypsum, humates, and clay. However, in the WSA itself, the Morrison Formation is the only layer known to contain a mineral commodity, uranium.

Figure 1

**Stratigraphic Section,  
Cabezon, Empedrado, Ignacio Chavez,  
La Lena, and Ojito Wilderness Study Areas**

ERA	SYSTEM OR PERIOD	GROUP	FORMATION OR MEMBER	LITHOLOGY
CENOZOIC	QUATERNARY		PEDIMENT	
	TERTIARY		SANTA FE	
	CRETACEOUS	MESAVERDE	PICTURED CLIFFS	
			LEWIS	
			CLIFF HOUSE	
			MENEFEE	
			POINT LOOKOUT	
			CREVASSE CANYON	
			GALLUP	
			MANCOS	
			DAKOTA	
			BRUSHY BASIN	
	JURASSIC	MORRISON FORMATION	WESTWATER CANYON	
			RECAPTURE	
			BLUFF	
			SUMMERVILLE	
			TODILTO	
MESOZOIC	TRIASSIC	SAN RAFAEL	ENTRADA	
			UNNAMED SILTSTONE	
			PETRIFIED FOREST	
			POLEO SANDSTONE LENTIL	
			SALITRAL SHALE TONGUE	
	PERMIAN	CHINLE FORMATION	AGUA ZARCA	
			SAN ANDRES	
			GLORIETA	
			YESO	
			ABO	
PALEOZOIC	PENNSYLVANIAN	MAGDA-LENA	MADERA	
	MISSISSIPPIAN		SANDIA	
	PRECAMBRIAN		ARROYO PENASCO	
			PRECAMBRIAN	



## PALEONTOLOGY

In addition to the above mineral resources, the sedimentary rocks of the Cabezon WSA contain a large fossil assemblage. This assemblage includes a substantial part of the Paleozoic and Mesozoic fossil record, although only fossils of Cretaceous age are found exposed at the surface (refer to Figure 1 for an outline of the geologic ages and corresponding strata). The environment of deposition of the Hosta Tongue of the Point Lookout Sandstone and the Satan Tongue of the Mancos Shale was such that the fossil record includes only those organisms adapted to a near-shore environment. This record includes marine invertebrates and occasional shark teeth. (Refer to Figure 1).

## WATER

### Surface Water

The WSA lies in a tributary watershed (refer to the Glossary) of the Rio Puerco, which ultimately flows into the Rio Grande. It is considered part of the Middle Rio Grande Major River Sub-Basin.

Arroyos in the WSA are ephemeral. Runoff occurs at many times throughout the year, but volume varies by season. Highest runoff commonly occurs during the summer thundershower season from July through September. Comparison of rainfall data with discharge data for this season shows that up to 99 percent of the annual discharge recorded at the gage may occur during this period (Craig 1980).

Average annual water yields from the WSA fall between 0.1 and 0.5 inches (.25 inches average, or 2,645 acre-feet per year). The water yield from Cabezon Peak ranges from 1 to 3 inches annually.

The average annual precipitation in the WSA is between 25 and 30 centimeters (between 10 and 12 inches), probably less than 4 percent of which is recorded as runoff downstream. The remaining 96 percent seeps into alluvium or bedrock units, or is lost through evapotranspiration.

Surface waters in the WSA include five reservoirs that are utilized by livestock and wildlife.

### Ground Water

The WSA lies within the state-declared Rio Grande Underground Water Basin. Ground water is not available at a reasonable depth except in shallow alluvium, and no ground water developments (wells and springs) are known to occur in the WSA.

The quality of ground water in the WSA ranges from fresh to moderately saline, but is commonly marginal for domestic uses. The present dominant water use in the WSA is by beef cattle and wildlife.

## SOILS

A large portion of the Cabezon WSA has undergone undesirable to critical levels of soil loss. Many of the soils are either severely eroded,

currently eroding at critical rates, or highly susceptible to sheet and gully erosion. These conditions exist on two soil mapping units, the Shingle Complex and Travesilla-Shingle-Rock Outcrop Complex (refer to Table A-1, and to symbols Lu and Rt on Map A-3).

TABLE A-1

## SOILS

Unit <sup>a/</sup>	Soil Type	Percent Slope	Acres
Ak	Alkali Alluvial Land	0-5	740
Bc	Basalt Outcrop-Orthents-Ustolls Complex	3-50	1,037
Km	Kim Loam	3-8	69
Lu	Shingle Complex	3-25	4,030
Ph	Penistaja-Hagerman Association	2-5	379
Rt	Travesilla-Shingle-Rock Outcrop Complex	3-30	1,796
Uc	Unnamed Clay Loam	0-3	67

Note: <sup>a/</sup> Unit-identified symbols correspond to Map A-3, Soils.

## VEGETATION

Table A-2 summarizes by range sites the vegetation located in the Cabezon WSA, and Map A-4 further identifies range site locations in the WSA.

Threatened and Endangered Plants

Cabezon Peak, a large volcanic plug, and the abutting basaltic flows that skirt it provide habitat for Mamillaria wrightii (pincushion cactus) and Pediocactus papyracanthus (blue grama cactus). One population of pincushion cactus has been located on the prominent shelf that breaks up the sheer relief of the slope of the peak. This species has also been found scattered on the lowlands of the Cabezon Peak in the grama grassland. Blue grama cactus has been found in one location. Both species are prized by collectors who usually decimate populations once they locate them (Knight 1981).



# SOIL TYPES, CABEZON WSA

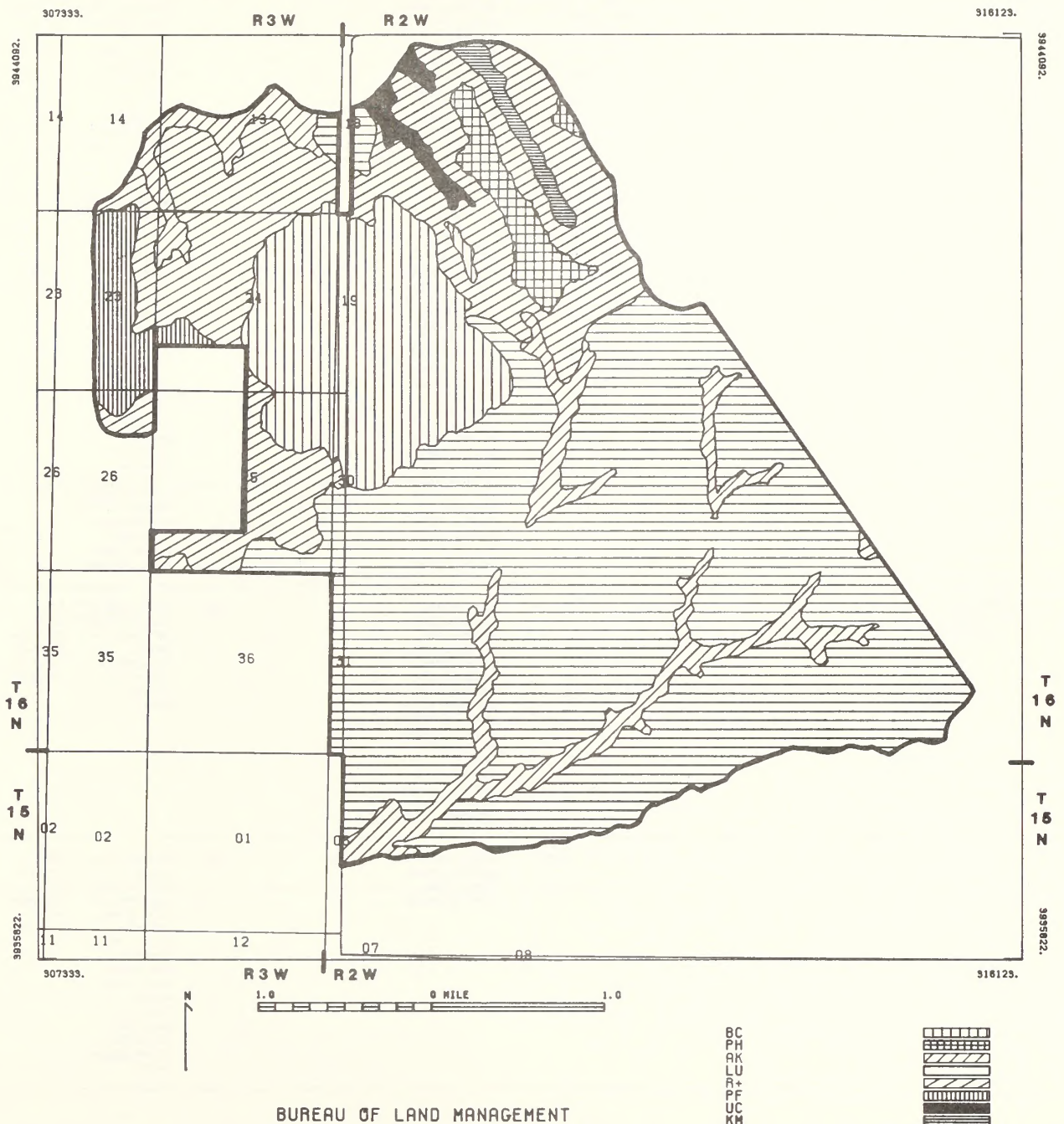


TABLE A-2  
VEGETATION, CABEZON WSA

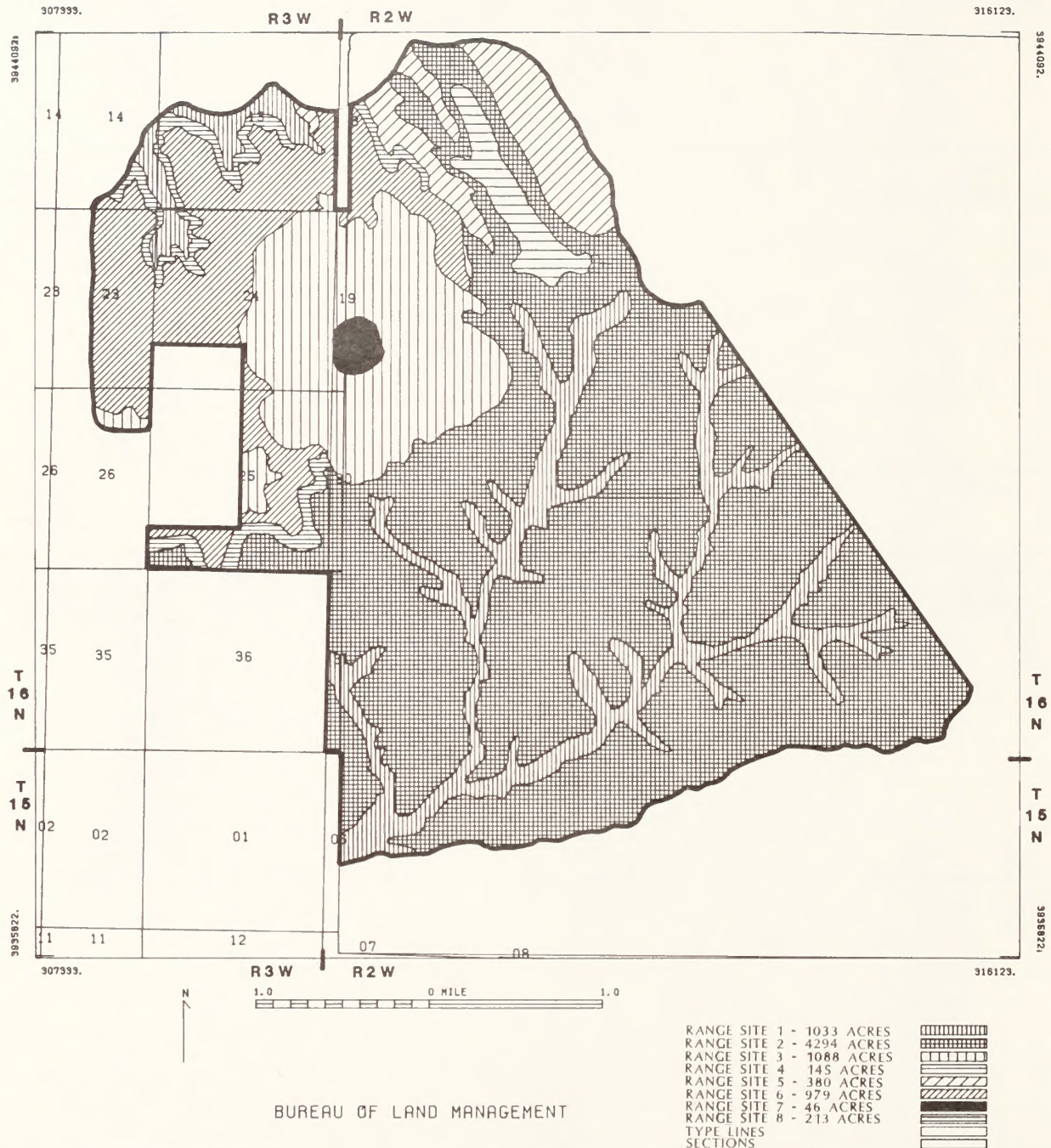
Range Site Number	Ecotype	Slope Percent	Aspect	Vegetative Cover (Percent)	Carrying Capacity Acres/AUM	Range Condition	Present Vegetation Species	Potential Perennial Plant Density (%)	Production (lbs/ac)	Potential Vegetation Species	Related Soil Type
1	Grama-galleta steppe	6	S	24	5.5	Fair-poor	Blue grama, galleta grass, alkali sacaton, sand dropseed, bottlebrush squirreltail, needle and thread grass, winterfat, broom snake-weed, fourwing saltbush	45	2,500	Alkali sacaton, blue grama, galleta grass, sand dropseed, burro grass, fourwing saltbush, winterfat, broom snake-weed, yellow flowered prickly pear, walkingstick cholla	080-Billings Variant Silty Clay
2	Pinyon-juniper woodland	6	S	30	8.3	Fair	Blue grama, alkali sacaton, sand dropseed, sideoats grama, ring muhly, bottlebrush squirreltail, western wheat-grass, shad-scale, broom snakeweed, one-seed juniper, pinyon, Mormon tea, fringed sage, cliff-rose, walkingstick cholla, winterfat, rubber rabbit-brush, yellow flowered prickly pear	15	525	Sideoats grama, Indian rice-grass, black grama, NM feather-grass, needle and thread grass, red threeawn, blue grama, galleta grass, winterfat, Bigelow sage, alpine sulfurflower, Wright eriogonum, soaptree yucca, one-seed juniper	060-Shingle Complex
3	Pinyon-juniper woodland	33	N, S, E, W	36	11.2	Good	Blue grama, galleta grass, needle and thread grass, black grama, bottlebrush squirreltail, sideoats grama, alkali sacaton, sand dropseed, broom snake-weed, walkingstick cholla, winterfat, one-seed juniper, pinyon	20	450	Blue grama, black grama, NM feather-grass, bottlebrush squirreltail, galleta grass	100-Basalt Outcrop Ustolls Complex
4	Grama-galleta steppe	4	N	31	6.2	Fair	Alkali sacaton, galleta grass, blue grama, sand dropseed	20	450	Indian rice-grass, bottlebrush squirreltail, blue grama, galleta grass, sand dropseed, red three-awn, ring muhly, fourwing saltbush, winterfat, broom snake-weed	050-Penist-aja-Hagerman Association



TABLE A-2 (Concluded)

Range Site Number	Ecotype	Slope Percent	Aspect	Vegetative Cover (Percent)	Carrying Capacity Acres/AUM	Range Condition	Present Vegetation Species	Potential Perennial Plant Density (%)	Production (lbs/ac)	Potential Vegetation Species	Related Soil Type
5	Grama-galleta steppe	4	N, S	46	5.3	Fair	Blue grama, galleta grass, ring muhly, alkali sacaton, sand dropseed, black grama, bottlebrush squirreltail, fourwing saltbush, broom snakeweed, rubber rabbitbrush	15	1,135	Alkali sacaton, blue grama, galleta grass, bottlebrush squirreltail, fourwing saltbush, winterfat, black greasewood, shadscale	090-Un-named Clay Loam
6	Grama-galleta steppe	18	E, S, W,	18	11.2	Fair-poor	Galleta grass, blue grama, alkali sacaton, sand dropseed, bottlebrush squirreltail, ring muhly, Indian ricegrass, shadscale, rubber rabbitbrush, broom snakeweed, one-seed juniper, fourwing saltbush	15	60-80	Pinyon, juniper, Indian ricegrass, blue grama, bottlebrush squirreltail, dryland sedge, big sagebrush, true mountain mahogany, antelope bitterbrush, shrub live oak, Gambel oak, goldenweed, soapweed yucca, broom snake-weed, pinque	010-Rock Outcrop-Travesilla-Persayo Assoc.
7	Barren	-	-	less than 2	-	-	-	-	-	-	100-Barren Rock Face and Talus Slopes
8	Grama-galleta steppe	60	S	8	56	Fair	Alkali sacaton, galleta grass, red threeawn, thurber muhly, shadscale, rubber rabbitbrush, one-seed juniper	15	60-80	Pinyon, juniper, Indian ricegrass, bottlebrush squirreltail, blue grama, dryland sage, big sagebrush, true mountain mahogany, antelope bitterbrush, shrub live oak, Gambel oak, goldenweed, soapweed yucca, broom snake-weed, pinque	010-Rim Rock-Rock Outcrop

# VEGETATION, CABEZON WSA



MAP A-4



## WILDLIFE

Eight habitat sites and two natural special habitat features have been identified in the Cabezon WSA. The habitat sites correspond to range sites described in the vegetation section above (refer to Table A-2), and the special habitat features are the volcanic neck that forms Cabezon Peak and the associated bluffs. This habitat supports some 90 vertebrate species. (A complete list of these animals is located in Run Wild, the USDA Forest Service 1982 computer printout on file in the BLM Albuquerque District Office.)

The wildlife in the WSA consists of varieties common to the southwest region of the United States. Mule deer, white-tailed antelope, and pronghorn antelope occur in the WSA, although none are abundant. The most common predator in the WSA is the coyote; rocky slopes and bluffs provide excellent habitat for bobcats and gray fox. Badgers have also been sighted in the WSA. Common small mammals include: cottontails, ground squirrels, deer mice, and white-throated woodrats.

The most commonly sighted birds are red-tailed hawks, sparrowhawks, horned larks, pinyon jays, ravens, western meadowlarks, and Oregon juncos. Scaled quail and mourning doves occur in small to medium numbers. Six species of waterfowl have reportedly used stockponds in the Ojo del Espiritu Santo Grant, which includes the WSA (USDI, BLM 1977). Two of these stockponds are located in the WSA.

Reptiles likely to be encountered in the area include the collared lizard, eastern fence lizard, bullsnake, and western diamond-backed rattlesnake.

### Threatened and Endangered Animals

No state or federally listed threatened or endangered animal species has been reported in the WSA; however, bald eagles are known to occasionally migrate through the Cabezon WSA.

## VISUAL RESOURCES

Cabezon Peak has been given a scenic quality rating of Class A, based on an assessment of seven key factors (landform, vegetation, water, color, influence of adjacent scenery, scarcity, and cultural modification). The high vertical relief of this prominent peak, in contrast to the surrounding landscape, adds favorably to the WSA's visual quality. Further, the WSA lacks esthetically discordant influences or modifications. Because of the peak's high scenic quality rating, a Class II visual resource management recommendation has been made for it (USDI, BLM 1972). (Refer to Enclosures 1 and 2 of this appendix for an explanation of these VRM class ratings).

## CULTURAL RESOURCES

Cultural resource inventory within the Cabezon WSA is limited to a reconnaissance of approximately one section (640 acres). Two sites have been recorded. One of these, reported as a small sherd scatter, appears to consist



of pieces from the same vessel and should properly be considered an isolated artifact.

The other cultural value recorded is a multiple component site located on top of Cabezon Peak itself. This site has great importance both prehistorically and historically, as reflected by its National Register status. One masonry-walled structure probably functioned as a prehistoric shrine. Apparent recent use of the structure and associated fireplace suggests the location retains its function as a shrine for Native Americans today.

The site and vicinity apparently represent a station in the complex, little-understood prehistoric Chacoan signaling system. This signaling system, probably associated with a prehistoric road system, ties together the central Chaco Canyon with over 80 known related "outlier" communities dispersed over 30,000 square miles. The great relative height of Cabezon Peak makes visible Chacra Mesa, Red Mountain, Mount Taylor, Hoste Butte, the peaks around Cerrillos, and several other known sites important in the Chacoan system.

The "Great Peak" not only has had direct use but has served as a landmark. It is located at the intersection of two trails, probably prehistoric in origin; it falls upon the Santa Fe to Fort Wingate stage coach and Star Line freight routes; and it is mentioned as a place in Pueblo and Navajo origin myths.

Cabezon Peak has also been a traditional boundary marker for the easternmost part of the Navajo Tribal world. It is featured as a reference in virtually all area explorations and is specifically mentioned in association with area Spanish land grants as early as 1767.

American occupation of the area around Cabezon Peak began during the war with Mexico in 1846. During the next 30 years, government troops and explorers crisscrossed the Cabezon Peak country.

A sizeable historic occupation has existed in this area, some evidence of which is located within the WSA. Using these known sites, recorded history, and evaluation of surrounding areas, it can be assumed that the Cabezon WSA contains substantial and dramatic evidences of occupation and use by humans for over 10,000 years.

#### AIR QUALITY

Ambient Air Quality monitoring data for the general area surrounding the Cabezon WSA was collected during 1975 and 1976 by the State of New Mexico Environmental Improvement Agency, Air Quality Division. Readings were all within the Class II Standards established by the Clean Air Act (as amended, 1977) for BLM-administered lands.



## SECTION 3

## EXISTING AND POTENTIAL USES

## MINERAL DEVELOPMENT

The Cabezon WSA is composed of both public domain lands and acquired lands that are part of the Ojo del Espiritu Santo Land Grant. Because the grant was acquired under the Bankhead-Jones Act, all of the locatable minerals have been reclassified as leasables, and exploitation of these minerals requires the issuance of a prospecting permit and lease. Those WSA lands situated outside of the grant boundaries are public domain lands and are underlain by BLM-administered minerals that are locatable under the 1982 mining laws.

As of August 1982, a total of 119 claims were staked within the Cabezon WSA, and 8 oil and gas leases issued. No mines or wells exist within the WSA boundaries, and the level of exploration activity has been low.

Table A-3 is a list of those mineral commodities that are known or suspected to occur beneath the WSA. It indicates that the highest potential for development is associated with uranium contained within the Morrison Formation. The geologic environment, the inferred geologic processes, the reported mineral occurrences and known mines or deposits indicate a high favorability for the accumulation of uranium. The completion of a successful exploration program could lead to the development of a moderate-sized conventional underground mine or in situ leaching operation. All of the other commodities in Table A-3 have only a low to moderate potential for development.

## WATERSHED

The Cabezon WSA is part of the Rio Puerco Watershed, which has one of the most severe soil erosion conditions in the United States. This watershed is one of the major tributaries of the Rio Grande, embracing approximately one-third of the drainage that lies in New Mexico above Elephant Butte Reservoir. The Rio Puerco supplies one-sixteenth of the waters of the Rio Grande, yet it is the source of 56 percent of the sediment that obstructs the main Rio Grande channel (Waite 1972).

The major drainage bottoms of the WSA are in the latter stages of an erosion cycle that was apparently initiated by overgrazing in the late 1800's and early 1900's. This past grazing use has resulted in extensive sheet, rill and gully erosion in all areas of the WSA except the slopes of Cabezon Peak. Gully erosion is a serious hazard along the drainages of livestock water locations because the vegetative cover has been depleted. Dry arroyos produce high sediment and waterflows after each torrential rainstorm. The main drainages are eroded to bedrock up to 10 feet deep, and side drainages are eroded by small rivulets of a few inches to 4 feet deep. The vegetation cover density of this part of the WSA cannot be increased substantially because the soil does not release water readily to plants (Clark 1975).

The slopes of Cabezon Peak have a slight erosion hazard, being covered by various-sized basalt stones that help retard erosion. The rolling

TABLE A-3  
MINERAL RESOURCE ASSESSMENT, CABEZON WSA

Mineral Commodity	Geologic Unit	Development Potential
<u>Locatables</u>		
Uranium and thorium	Abo Formation	---
	Morrison Formation	4-B
	Dakota Formation	---
	Mancos Formation	---
Metals (copper, silver, molybdenum and gold)	Agua Zarca Member	3-B
	Abo Formation	3-B
	Madera Formation	3-B
Non-Metallics (gypsum)	Todilto Formation	3-A
<u>Leasables</u>		
Oil and Gas	Sandia Formation	3-C
	Entrada Formation	3-C
	Dakota Formation	3-C
	Mancos Formation	3-C
	Mesa Verde Group	3-C
Geothermal	No specific geologic unit	2-A
Sodium and potassium	No specific geologic unit	2-A
Coal	Dakota Formation	1-C
	Mesaverde Group	1-C
Bituminous rock	No specific geologic unit	2-C
<u>Salables</u>		
Sand and gravel	No specific geologic unit	3-C
Clay (common varieties)	No specific geologic unit	3-A
Humates	Mesaverde Group	2-A
Petrified wood	Mesaverde Group	2-A
Cinders	No specific geologic unit	3-C

A - Insufficient Data; B - Indirect Evidence; C - Direct Evidence  
D - Abundant Direct and Indirect Evidence

- 1 - The geologic environment and the inferred geologic processes do not indicate favorability for accumulation of mineral resources.
- 2 - The geologic environment and the inferred geologic processes indicate low favorability for accumulation of mineral resources.
- 3 - The geologic environment, the inferred geologic processes, and the reported mineral occurrences indicate moderate favorability for accumulation of mineral resources.
- 4 - The geologic environment, the inferred geologic processes, the reported mineral occurrences, and the known mines or deposits indicate high favorability for accumulation of mineral resources.

Adapted from GEM Study and Turner, BLM, 1982.



foothills at the base of these slopes are broken by scattered pockets of moderately deep soil. The natural fertility of the soil is high; it is well-drained to aid in maintaining the good cover of native grasses, shrubs, and juniper and pinyon trees (Clark 1975).

The average rate of erosion for the WSA is moderate. The erosion occurring on the WSA is quantified in Table A-4 (in acre-feet per square mile per year).

TABLE A-4

## EROSION

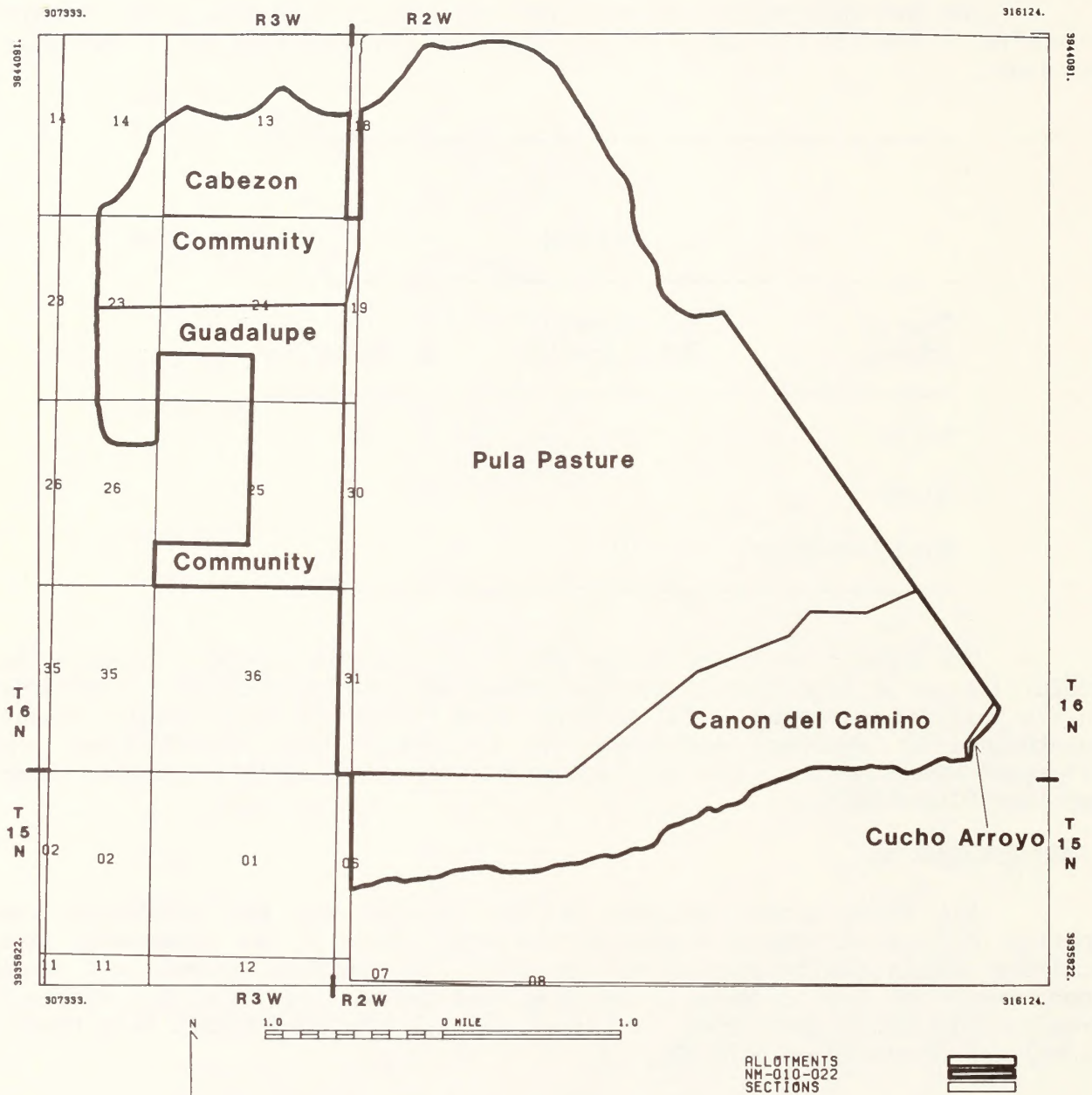
Type of Erosion	Percentage of Total Erosion	Ac-ft/mi <sup>2</sup> /yr
Gully	25	2.1
Sheet	65	.7
Wind (abrasion)	10	.1

The erosion occurring on the WSA is an economic detriment because the useful life of a reservoir in this watershed is one-half that of a reservoir in a stabilized watershed. Additionally, most fences and roads require annual maintenance at drainage crossings due to damage from runoff flow, and livestock losses occur in the WSA because of the poor quality of surface water supplies (Clark 1975).

## LIVESTOCK GRAZING

All 8,118 acres included in the Cabezon WSA are authorized for grazing on five allotments (refer to Map A-5). None of the allotments lies entirely within the boundaries of the WSA. The grazing systems and range improvements on the allotments are discussed below, and Table A-5 displays grazing information pertaining to them. A total of 1,207 Animal Unit Months (AUMs) are permitted on this WSA.

# RANGE ALLOTMENTS, CABEZON WSA



BUREAU OF LAND MANAGEMENT



TABLE A-5  
RANGE ALLOTMENT INFORMATION

Allotment Name	Number	Total Acres	WSA Acres	Number of Permittees	Authorized Livestock Numbers	Season of Use
Pula Pasture	0074	7,177	4,932	6	115 head	Yearlong
Canyon del Camino	0053	4,936	1,466	1	69 head	Yearlong
Cabezon Community	0044	4,422	856	4	58 head	Yearlong
Guadalupe Community	0047	9,814	860	2	88 head	Yearlong
Cucho Arroyo	0057	4,917	4	2	110 head	6 months (12/1-5/31)

#### Pula Pasture Allotment (#0074)

No grazing management systems have been proposed for this allotment. Three dirt tanks and 7 miles of allotment boundary fence separate this allotment from three other allotments that have acreage within the WSA. These improvements are all within the boundaries of the WSA.

#### Canyon Del Camino Allotment (#0053)

Three pastures of the allotment are being used, but this use is not systematic because the eastern pasture contains no permanent water. This pasture has two dirt tanks that only impound water during favorable summer rainfall years.

Erosion control devices, such as retention dams and a series of sand dikes, are also being considered in order to arrest the severe erosion occurring on this allotment; these devices would enhance forage production. One dirt tank and approximately 5 miles of fence already exist inside the WSA.

#### Cabezon Community Allotment (#0044)

One stock tank and a total of 2.1 miles of allotment boundary fence exist within the WSA. The boundary fence divides the Cabezon Community Allotment from two adjoining allotments, the Pula Pasture and the Guadalupe Community.

Guadalupe Community Allotment (#0047)

The BLM's Proposed Rio Puerco Livestock Grazing Management Environmental Statement (1978) proposed a six-pasture grazing system for this allotment.

FOREST PRODUCTS

No authorized wood collection areas have been set up within the Cabazon WSA, and several fuelwood trespasses have been recorded. Periodic pinyon nut collection is assumed to occur on a small scale.

RECREATION

Cabazon Peak has provided a popular climbing spot for many years. Several clubs and individuals utilize the peak annually, as shown by an informal register placed on top of the peak during the summers of 1980 and 1981, which has recorded approximately 300 persons to date. The climb is considered appropriate for both beginning and intermediate climbers, with an expansive view of the Rio Puerco Valley rewarding the effort.

Approximately 60 to 100 hunter days are spent annually in the WSA in pursuit of quail, doves, rabbits and coyotes. Trapping for coyote and bobcat varies with the price of pelts. Most of the recreation use associated with wildlife occurs within one-half mile of boundary roads.

Random off-road vehicle use occurs in the Cabazon WSA by both motorcycles and four-wheel drive vehicles. Much of the four-wheel drive activity is associated with hunting.

EDUCATION/RESEARCH

Cabazon Peak itself provides interesting subject matter for geologic study. Research and educational values have historically been associated with Cabazon Peak and continue to be so (refer to Section 2, Existing Resources--Geology). Prehistoric and historic shrines contained within the Cabazon WSA also provide a good basis for research and education, as does the habitat for two species of threatened and endangered cactus (refer to Section 2, Existing Resources--Vegetation and Cultural Resources).

NATIVE AMERICAN USES

Native Americans (particularly nearby Navajo, Jemez, Zia and Santa Ana peoples) have traditionally used and continue to use the Cabazon WSA for hunting and other activities. The shrine atop Cabazon Peak has traditional value to Jemez Pueblo, although its use today is less frequent than in the past. The Jemez Pueblo eagle-catching society requested a BLM permit to engage in ceremonial activities in the fall of 1982 on and around Cabazon Peak. Use within this WSA by Jemez Pueblo (and probably others) for the taking of eagles was heavy until about 40 years ago.



Recent survey and interviews with officials of Jemez, Zia, and Santa Ana Pueblos and the Canyoncito Navajo Reservation generally show that many places of religious significance exist in and near Cabezon Peak, but that specific site locations are not known to the lay members of the tribes. Tribal elders know and watch over such sites. Apparently it would be indiscreet for the secular governments to propose a survey or to provide any information of such an esoteric nature.

#### REALTY ACTIONS

A powerline right-of-way (NM-559354) constitutes part of the Cabezon WSA's eastern boundary, and lies near a proposed 500-kV transmission line corridor that would service the proposed New Mexico Generating Station. However, present information provided by Public Service Company of New Mexico indicates that this transmission line could be accommodated entirely outside of the present boundaries of the WSA.

The area to the east of the Cabezon WSA and to the west of the Ojito WSA (refer to Map A-2) has been described as an important public land "window" through which any future pipeline or powerline rights-of-way may pass.

#### WILDLIFE

Cabezon Peak and the bluffs southwest of it are particularly attractive to birds of prey and swallows for perching and nesting sites. These two volcanic formations are the major special habitat features identified in the WSA. Cabezon Peak has been extensively searched by aircraft in the past, and no sign of nesting or raptor use was evident. The lack of raptor use may be related to the fact that the peak is a pronounced landmark frequently visited by aviators and climbers. However, "whitewash" was noticed in the 1981 field season, indicating that raptors may have started using the peak.

Antelope use of the WSA is limited because these animals require more gentle terrain. The few antelope using the WSA normally utilize the eastern boundary. No open season for antelope has occurred in the WSA.

Because trees and shrubs are relatively scarce, the WSA is only marginal mule deer range. As the result of the low number of deer on the WSA, it is not highly attractive to deer hunters; estimated use is less than 20 hunter days annually. A report was received, however, of a trophy-class buck taken from the slope of Cabezon Peak in the 1981 season.

Habitat for quail and doves is marginal, and existing quail numbers are low (USDI, BLM 1977). The topographic features and climate of the WSA appear favorable for quail, and a high degree of potential for improvement exist.

During the wetter months of the summer rainy season, water is normally available for wildlife use in the pools, reservoirs, and intermittent streams of the WSA; with the approach of the drier seasons, water becomes scarce. This is particularly true during late spring and early summer, when succulent vegetation is also scarce.

Waterfowl and shorebird habitat exists on approximately 2 acres of temporary water located in livestock reservoirs and soil stabilization projects. While none of these provide year-round waters, they are frequently full during the fall migration and commonly contain water in the spring. Where these reservoirs are protected from overutilization by livestock, either by fencing or a rest-rotation management system, the annual drawdown due to evaporation allows for an invasion of shoreline vegetation, which provides food and cover for ducks and shorebirds.

The Cabazon WSA is within the boundaries of the Ojo del Espiritu Santo Grant and Upper Rio Puerco Habitat Management Plans (HMPs). The former has the most effect on wilderness management considerations. This HMP proposes projects to eliminate limiting factors by constructing waters, perch sites, and exclosure fences, and by maintaining stock ponds. These projects would benefit most species. Two exclosures associated with stock tanks are the only habitat improvements in the WSA.

Control of predators and rodents (primarily coyotes and prairie dogs) is sometimes requested by livestock operators when these animals affect livestock operations. No animal damage control requests have been received by the BLM for the Cabazon WSA in the past 2 years. In response to a questionnaire sent out in 1978, however, several of the allottees expressed interest in being included in animal damage control operations.



## SECTION 4

## WILDERNESS CRITERIA

## EVALUATION OF WILDERNESS VALUES

Quality of Mandatory Wilderness Characteristics

## Naturalness

The imprint of man within the Cabezon WSA is substantially unnoticeable. (The cumulative impact of the man-made intrusion or intrusions has been evaluated. This is a function of the size of the WSA, and the number and distribution of the impacts.)

The Cabezon WSA contains a fenceline network, constructed of a mixture of wooden and metal posts. Six vehicular ways are used primarily for access to range improvements. These improvements consist of five small retention dams visually buffered by rolling topography. Because of the unyielding nature of the peak itself, few manmade imprints have occurred, leaving the WSA in an exceptionally natural state.

## Solitude

The unique geology of the Cabezon WSA provides an outstanding opportunity for solitude for those who choose to climb the peak itself or wander among the foothills. The peak provides an excellent internal topographic buffer, allowing utilization by several groups.

## Opportunities for Primitive and Unconfined Recreation

The Cabezon WSA offers an opportunity for sightseeing and photography related to scenic, geologic and cultural values, as well as the occasion for climbing. (Refer to Section 3, Recreation, and the following discussion of special features).

Special Features

Cabezon Peak, a volcanic plug, is similar in form to Devil's Tower, Wyoming, and related in origin to the volcanic neck at Shiprock, New Mexico. Although scores of volcanic necks are found throughout the high plateau country of Arizona, New Mexico, and Utah, Cabezon is, by its size and form, outstanding among them. (Refer to Figures 2 and 3).

Cabezon Peak provides an excellent scientific opportunity to study the internal plumbing of a volcano. The volcanic neck has provided geologists with many clues regarding the geologic event that culminated with the spread of the lava flows of the Cebolleta Mesa. Many of the volcanic centers that contributed lava to the flows are still buried beneath the basalt cap, but Cabezon Peak is one center now exposed for scientific study and inspection.

Populations of two proposed threatened or endangered plant species have been located in Cabezon WSA: Mamillaria wrightii (pincushion cactus) and Pediocactus papyracanthius (blue grama cactus).



Figure 2 - The Cabezón WSA is dominated by flat grassy plains, pinyon-juniper-covered foothills, and a volcanic plug jutting more than 2,000 feet from the the Rio Puerco Valley floor. "El Cabezón", as the peak is known, is historically, culturally, and geologically significant.



Figure 3 - Members of the New Mexico Mountain Club ascend El Cabezón annually. Scaling "the chimney" is one of the more difficult manueveurs of the non-technical trek.



Significant prehistoric and historic special features are associated with the cultural resources of Cabazon Peak and its immediate surroundings. These include a Chacoan signal/shrine site atop the peak.

Two special wildlife habitat features are formed by Cabazon Peak and the surrounding bluffs; these are among several geologic formations in the area valuable as habitat for non-game species, including birds of prey.

The visual resources and geology of Cabazon Peak highlight its significance as an important historic and contemporary visual landmark.

### Multiple Resource Benefits

The Cabazon WSA contains many natural values as a result of its relatively undisturbed character. Congressional designation as wilderness would carry the weight of law and would provide a greater degree of long-term protection for these natural values than would the administrative designations available to the BLM. (A more detailed discussion of the multiple resource benefits of wilderness designation may be found in Section 6 of this report, under the discussion of the impacts of the All Wilderness Alternative.)

### Diversity in the National Wilderness Preservation System

#### Ecotypes Present

The Cabazon WSA, according to Robert G. Bailey (USDA, FS 1980), is classified under Dry Domain in the Highland Province and the Colorado Plateau Sub-Province. This area can be further subdivided into the Grama-Galleta Steppe and Juniper-Pinyon Woodland Mosaic ecotypes (Kuchler 1964).

Grama-Galleta Steppe. Covers approximately 2,461 acres (30 percent) of the WSA.

Juniper-Pinyon Woodland. Covers approximately 5,657 acres (70 percent) of the WSA.

Map A-6 displays these ecotypes. Vegetation Map A-4 breaks each ecotype into more refined site categories that are narrated in Table A-2 (Section 2-- Vegetation).

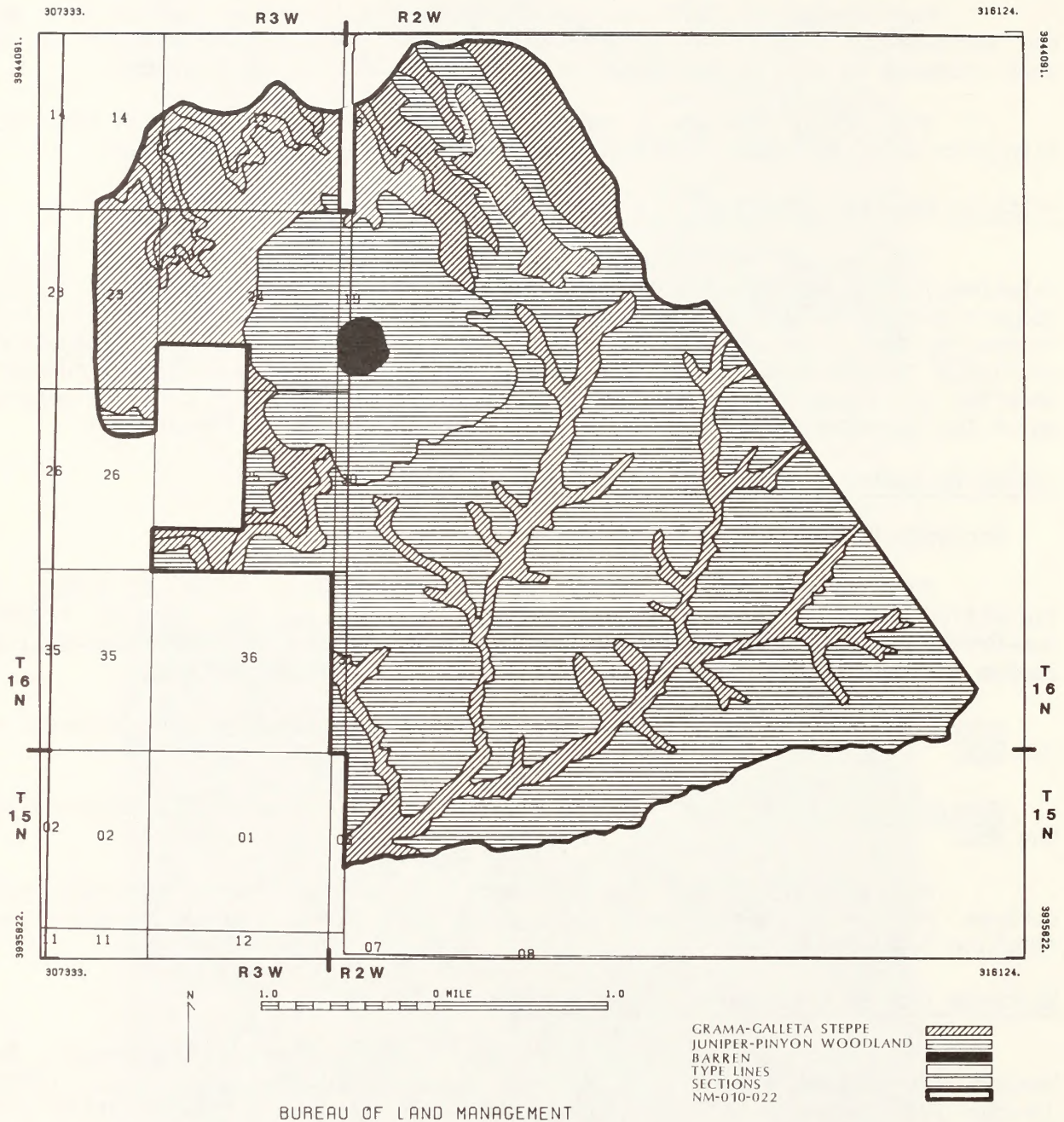
### Distance from Major Population Centers

The Cabazon WSA is within 5 hours' driving time of Albuquerque, New Mexico, identified as part of a Standard Metropolitan Statistical Area (SMSA) in the 1980 census (USDC, BC 1981). The WSA is a 2 1/2-hour drive from Albuquerque or Santa Fe, New Mexico (refer to Map A-2).

### MANAGEABILITY

Cabazon WSA can be effectively managed for wilderness because of its rugged nature, lack of private inholdings, and lack of encumbrance by valid existing rights.

# ECOTYPES, CABEZON WSA



MAP A-6



The Cabazon WSA contains no private or state inholdings. However, the State of New Mexico holds 1,320 acres contiguous to the western boundary of the WSA (refer to Map A-1). Acquisition of this acreage by purchase or exchange would enhance the overall land pattern and improve the manageability of the WSA. The maintained dirt road would become the boundary, rather than property boundaries which are presently difficult to discern on the ground.

A slender 20-acre parcel of private land protrudes into the northern boundary of Cabazon (refer to Map A-1). Acquisition of this parcel would simplify the overall management of the Cabazon WSA.





## SECTION 5

## PUBLIC INVOLVEMENT OVERVIEW

This report has been prepared using public input obtained by widespread mailings, public meetings, open houses, and personal contacts. These efforts began during the wilderness inventory phase and will continue during the preparation of the statewide wilderness EIS.

Considerable interest in the the management status of the Cabezon WSA has been expressed by the public. The WSA's close proximity to the cities of Albuquerque and Santa Fe and its resultant ease of access for such a large percentage of New Mexico's population has been pointed out. Cabezon's wide variety of supplemental values, natural characteristics, and opportunities for solitude and primitive and unconfined recreation have also been noted.

Opponents of wilderness designation for the Cabezon WSA have discussed the effect of excluding the WSA from possible future mineral exploration and development, the presence of human impacts, and possible limitations on ranch operations. (Refer to the summary of public response from the intensive inventory, located in Enclosure 3 to this appendix.)

During the public comment period on the Draft EA - Albuquerque District Wilderness (USDI, BLM 1983), 34 public inputs were received on the Cabezon WSA. Five inputs expressed opposition to wilderness designation. Several comments cited conflicts with development of uranium, copper, gold, oil and gas. It was also suggested that Cabezon's special values, including the recreation opportunities, could be better managed without wilderness.

Twenty-nine inputs favored wilderness designation. In addition to Cabezon's outstanding wilderness characteristics of solitude and recreation, it is a favorite hiking area. The peak also represents a "good deal of history," being a significant landmark. One input stated preserving Cabezon as a wilderness area would ensure the survival of representative scenery of the Rio Puerco Basin.

Additional comments expressed surprise that such a "renowned landmark" was not already designated. Others suggested aquisition of the 20-acre sliver of private land protruding into the north border of Cabezon WSA. Others commentors felt the document did not express the full oil and gas potential of the area, but submitted no further information to change the initial assessment. Several inputs felt the erosion problem could be corrected without major, intensive action, and therefore no acreage should be dropped from Cabezon WSA's initial boundary. (Refer to the Public Response Summary for the Albuquerque Draft Wilderness EA, Enclosure 3 to this appendix.)





## SECTION 6

## ALTERNATIVES AND IMPACTS

This section discusses three alternatives for the Cabezon WSA: All Wilderness, Amended Boundary, and No Action (management under the existing plan).

## ALL WILDERNESS ALTERNATIVE

Under this alternative, the entire 8,118 acres of public land within the Cabezon WSA would be recommended as suitable for wilderness designation. On any acreage designated as wilderness, the existing and potential uses would be regulated by the BLM's Wilderness Management Policy (1981). Wilderness values would be retained and protected over the long term by management under this policy. The added protection of congressional wilderness designation would significantly benefit the wilderness resources in the WSA.

Impacts on Minerals

Wilderness designation would significantly lower the potential for development of all locatable and leasable mineral commodities that may occur under the WSA. Although at least a moderate favorability exists for the occurrence of copper, silver, gypsum, oil and gas, sand, gravel, clay, and cinders, and a high favorability for uranium and thorium, the designation of the Cabezon WSA as a wilderness would curtail exploration and prevent possible future extraction.

However, under current economic conditions, little demand is present for the extraction of copper, silver, uranium, thorium, bituminous rock, molybdenum, gold or clay from the WSA's reserves. On the other hand, although gypsum, sand, gravel and humates occur throughout northern New Mexico, any of these resources located in the Cabezon WSA would be considered economically attractive on a regional basis. This is because extraction near the source of utilization is essential to achieving an acceptable profit margin.

Impacts on Other Resources and Uses

The All Wilderness Alternative would not have significant impacts on air quality in the Cabezon WSA, so this resource is not included in the following discussions.

## Soils, Watershed and Vegetation

The erosion and subsequent sediment transport from the Cabezon WSA contributes to downstream, off-site damage to reservoirs, fences, and roads. The deterioration of water quality in the Rio Grande, and ultimately, the amount of silt carried to Elephant Butte Reservoir, has a serious economic impact downstream because it affects irrigation and livestock water quality. This erosion problem is particularly evident in the Canyon del Camino Allotment (refer to Map A-5).

A serious need exists for watershed restoration where past grazing use has caused deteriorated soil and hydrologic conditions in this allotment. Reestablishment of vegetation through livestock management alone would not be enough to restore the watershed condition, so extensive water control structures such as retention dams have been proposed in order to slow down gully erosion and sediment transport. These techniques would not be allowed under wilderness management because they are not compatible with the wilderness characteristic of naturalness. Therefore severe erosion would continue.

Impacts that would occur as a result of the intensive management needed to correct the serious erosion problem would not be allowed. Overall, impacts to soil, water, and vegetation in the WSA could be significant.

#### Wildlife

Restrictions on surface-disturbing activities and mechanized activities could help prevent decreases in wildlife populations. Restraints on methods of animal damage control could be made, and a reduction in legal and illegal furbearer harvesting would occur. Impacts under this alternative would not be significant.

#### Visual Resources

Existing visual resources would be protected. Only minor modifications in the basic elements of the landscape could occur as a result of natural ecological changes, and very limited management activity would be permitted. Under this alternative, impacts to visual resources would not be significant.

#### Cultural Resources

Site-condition monitoring associated with wilderness surveillance could prove beneficial, because over 80 percent of the Rio Puerco Resource Area's known cultural sites suffer from significant natural deterioration. Increased monitoring under wilderness designation would increase the ability to detect, and if warranted, to arrest serious deterioration at relatively early stages.

The wilderness management policy allows the natural decay of sites. Excavation and stabilization may be permitted on a case-by-case basis where the State Director determines that the project would not degrade the overall wilderness character and when such activity is needed to preserve the particular cultural resource.

Limited surface-disturbing activities would be allowed under wilderness designation. This could prevent destruction of the Cabazon WSA's cultural sites through other than natural causes. Overall, wilderness designation would have little impact on cultural resources.

#### Livestock Grazing

The existing level of livestock grazing would continue on the Cabazon WSA under wilderness designation. Wilderness designation would not prevent any increase in AUMs based on Allotment Management Plans (AMPs).



However, livestock operations on the Cabazon WSA could be affected by wilderness designation because of limitations imposed on the maintenance of existing range improvements. Although grazing is a permissible and compatible activity under wilderness designation, limitations on vehicular access, type of construction materials, or location of improvements may occur in order to protect wilderness characteristics.

A management conflict on the Canyon del Camino Allotment (#0053) exists. This allotment has sustained severe vegetation and soils damage, thus reducing available forage. The proposed improvements for this allotment (retention dams and sand dikes) have been deemed absolutely necessary to arrest this severe damage, and should be implemented as soon as possible. Wilderness management would not allow construction of these erosion-control devices.

Wilderness designation under this Alternative would have a significant impact on the Canyon Del Camino Allotment as a result of limiting measures to arrest the erosion problem. Other allotments within the WSA would not be significantly affected.

Only 4 acres of the Cucho Arroyo Allotment (#0057) are contained within the WSA, making management of the total allotment more complicated.

The pipeline system proposed in the AMPs for the Cabazon WSA will not be constructed. The BLM Final Range Improvement Policy (dated October 15, 1982) eliminated the pipeline construction base funding.

#### Forest Products

It is assumed that increased management attention (such as regular patrol) would occur under wilderness designation and could curtail illegal woodcutting. Under this alternative, the pinyon-juniper vegetation type could benefit from the prevention of removal under wilderness designation. No significant impacts are anticipated.

#### Recreation

Popular recreation activities that require motorized vehicles in the Cabazon WSA would be affected, including some hunting and motocross activity. However, wilderness designation would ensure that the present opportunities for primitive and unconfined recreation would be available to meet high regional demands. Although some of these opportunities exist outside of the WSA, it provides the natural setting upon which the outstanding recreation quality is dependent. This is particularly true of the climbing opportunity Cabazon Peak provides.

In summary, the use of motorized vehicles would not be permitted. However, such use is low in the Cabazon WSA, so wilderness designation should not have a significant impact on motorized recreation. Other recreation uses occurring in the WSA and not dependent on motorized equipment would not be significantly impacted.

## Education/Research

Wilderness designation would ensure preservation of the existing "natural laboratory" in the Cabezon WSA. Opportunities for geologic and cultural study are particularly good. No significant impacts to education and research in the WSA would occur, because the WSA would have the added protection of Congressional wilderness designation.

## Native American Uses

Limitation of vehicular access could limit Native American uses. However, the preservation of solitude and naturalness could enhance these activities, because they are often dependent on specific natural settings. The impacts are not anticipated to be significant.

## Realty Actions

The narrow "window" of public land sandwiched between the eastern boundary of the Cabezon WSA and the western boundary of the Ojito WSA (refer to Map A-2) may not be large enough to accommodate future pipeline rights-of-way if both WSAs become designated wilderness. If this is the case, the designation of Cabezon would result in powerlines and pipelines being rerouted. Such rerouting would cost the applicants - and thus, consumers - more to implement.

## AMENDED BOUNDARY ALTERNATIVE

Under this alternative 6,555 acres of public land within the Cabezon WSA would be recommended for wilderness designation (refer to Map A-1). This alternative eliminates conflicts between wilderness and the effective control of erosion in the Canyon del Camino Allotment, and conflicts with realty actions. The amended boundary would exclude 1,429 acres of public land in the southern portions of the WSA and 134 acres along the eastern boundary. If the area within the amended boundary is designated wilderness, all existing and potential uses would be managed under the BLM's Wilderness Management Policy (1981).

### Impacts on Wilderness Values

The reduced WSA acreage would not significantly impact existing wilderness values, because most of these values cluster around Cabezon Peak and the foothills surrounding it. In addition, this modification would place the boundary along a fenceline, that is a readily identifiable boundary; this would enhance the effective management of Cabezon.

### Impacts on Minerals

Impacts on minerals would remain the same as stated in the All Wilderness Alternative, except fewer acres would be impacted.



## Impacts on Other Resources and Uses

The Amended Boundary Alternative would not have significant impacts on air quality in the Cabezon WSA, and for this reason this resource is not included in the following discussions.

### Range

Removal of the Canyon del Camino Allotment (#0053) from within the Cabezon WSA's boundary would eliminate conflicts with the implementation of erosion projects on 1,425 acres of severely eroded public land. Extensive erosion-control techniques need to be applied on this portion in order to salvage the existing soil and vegetation resource. These needed improvements would not be allowed under wilderness management, because they are generally incompatible with the concept of naturalness.

Four acres of the Cucho Arroyo Allotment (#0057) would also be removed from the WSA, because this portion would no longer be contiguous with the WSA's main body.

### Realty Actions

Retracting a portion of the eastern boundary of Cabezon 1/8 mile to the west would allow "breathing room" for additional pipeline rights-of-way (refer to Map A-1). This impact, the extent of which cannot be quantified, would lessen the need for rerouting pipelines and powerlines, thus keeping construction costs lower.

### Recreation

Conflicts with ORV use would be reduced. Approximately 5 miles of boundary road would be removed from the WSA, allowing ORV activity associated with hunting to continue along the road. Primitive recreation values would be retained.

Impact to other resources would remain the same as stated in the All Wilderness Alternative, for the 6,555 acres remaining within the wilderness boundary. On the 1,563 acres deleted from wilderness consideration, most activities would resume including stabilization of the watershed. Under the Amended Boundary Alternative, the impacts on recreational use of this WSA would not be significant.

## NO ACTION ALTERNATIVE

In the Draft Environmental Assessment, the Wilderness Analysis Report for this WSA (Appendix A) included three alternatives: All Wilderness, Amended Boundary, and No Action. Since the Draft's publication in March 1983, a comprehensive land use planning effort has been initiated in the Rio Puerco Resource Area. This effort is called a Resource Management Plan (RMP). Tentative alternatives in the RMP currently include possible special designation for all or part of this WSA. As a result, the scope of the No Action Alternative for this WSA has changed.

Until Congress makes its decision on wilderness designation, the WSA will be managed under the Final Interim Management Guidelines for Lands Under

Wilderness Review (USDI, BLM 1983). If Congress designates it as wilderness, the WSA will be managed under the Wilderness Management Policy (USDI, BLM 1981).

If the WSA is not designated as wilderness, it will be managed under the No Action Alternative, which would involve management under other than wilderness policy. Management would follow the guidelines of the Rio Puerco RMP.

The RMP is expected to be approved in late 1985 while the wilderness study process is still underway. Therefore, the RMP decision concerning this WSA may be incorporated into the Wilderness Study Report to be written later in this process. The tentative RMP proposal for the Cabazon WSA currently emphasizes management of the scientific, educational, and interpretive potential of the following values: T&E plant species, cultural resources, geology, visual resources, and semi-primitive non-motorized recreation experience. If the approved RMP does not include special designation for any portion of the Cabazon WSA, the WSA would be managed under the No Action Alternative according to multiple use concepts without stressing the values listed above. The most probable uses of the area would be livestock grazing, mineral exploration, and ORV use.

#### Impacts to Wilderness Values

Mineral exploration and development, increased ORV activity, and increased use of motorized vehicles would reduce the opportunity to experience solitude or primitive and unconfined recreation. Over time, all of these uses could be expected to significantly impact naturalness. The fragile resources discussed previously would be particularly vulnerable to development-oriented management.

To date, no protective designation other than wilderness has been proposed for the Cabazon WSA. The cumulative effect of this lack of a protective designation and the above management practices would be to degrade or eliminate the Cabazon WSA's naturalness, causing a significant impact over the long term.

#### Impacts on Other Resources and Uses

The No Action Alternative would not have significant impact on forest products, air quality, realty actions, livestock grazing, or minerals. For this reason these resources are not included in the following discussion.

##### Soils, Watershed, Vegetation

Continued vehicular access and other surface-disturbing activities could result in additional ruts and create the potential for reduced watershed quality. This occurrence would also affect soils and vegetation, including threatened and endangered plant species. However, all necessary actions needed to retard the severe erosion occurring within the southern portion of the Cabazon WSA could be fully implemented. This would still leave the majority of the area with reduced watershed quality, and allow greater soils



and vegetation damage than would occur under wilderness designation. The cumulative impacts on soils, water, and vegetation under this alternative would not be significant.

#### Wildlife

Non-wilderness management could result in an increase in human activity in the Cabazon WSA. This activity would impact those wildlife species dependent on an unmodified habitat, such as mule deer, antelope, badgers, and many common small mammals. Overall, impacts on wildlife under this alternative would not be significant.

#### Visual Resources

Existing visual resources could deteriorate due to authorized uses and the potential for landform and vegetation modification. These impacts, however, are not expected to be significant.

#### Cultural Resources

Continued vehicular access would allow the potential for vandalism to remain, but would also allow for more frequent vehicular patrol and monitoring. Cultural resources could be vulnerable to surface-disturbing activities. These impacts could be mitigated by a wide variety of management options other than wilderness designation, such as withdrawals and closures, as well as specific site or area cultural resource management plans. The No Action Alternative would have little impact on cultural resources.

#### Recreation

Opportunities for primitive recreation could be reduced under non-wilderness management. The Cabazon WSA is one of the areas closest to Albuquerque and Santa Fe that provides a primitive recreation experience. The WSA is very popular and receives a great deal of use from the populations of these two cities. This primitive recreation option could be significantly impacted under the No Action Alternative, because more extensive development of the area could occur.

Recreation relying on vehicular travel, as well as motocross use, would not be significantly impacted. This opportunity is readily available throughout the majority of the Rio Puerco Resource Area.

#### Education and Research

The natural setting supporting the special features would be subject to increased surface disturbance and vehicular travel. This would considerably degrade the Cabazon WSA's potential for use as a natural laboratory. The cumulative impacts to the natural setting could be significant over the long term, because protective management of the area would not be ensured through Congressional designation.

#### Native American Uses

The natural settings in which Native American uses often take place could be subject to surface-disturbing activities. The magnitude of the impact cannot be quantified because of the extent of the activity is not known.

## ENCLOSURE 1

### CRITERIA FOR VISUAL RESOURCE MANAGEMENT CLASSES

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- Class I - Applies only to classified special areas, e.g., roadless, wilderness, primitive, natural areas, etc. This quality standard is established through legislation or policy. Only natural ecological changes are allowed.
- Class II - Landscapes with Class A scenery quality, or Class B scenery quality in the foreground/middleground zone with high visual sensitivity. Changes in any of the basic elements (form, line, color or texture) caused by a management activity should not be evident in the characteristic landscape.
- Class III - Landscapes with Class B scenery quality and high visual sensitivity in the background visual zone, or with Class B scenery quality and medium visual sensitivity in the foreground/middleground visual zone or with Class C scenery of high visual sensitivity in the foreground/middleground zone. Changes in the basic elements (form, line, color, texture) caused by management activity may be evident in the characteristic landscape. However, the changes should remain subordinate to the visual strength of the existing character.
- Class IV - Landscapes with Class B scenery quality and high visual quality sensitivity in the seldom seen visual zone, or with Class B scenery quality and medium or low visual sensitivity in the background or seldom seen zones, or with Class C scenery quality (except with high sensitivity in the foreground/middleground zone). Changes may subordinate the original composition and character but must reflect what could be a natural occurrence within the characteristic landscape.
- Class V - Applies to areas identified in the scenery quality inventory where the quality class has been reduced because of unacceptable intrusions, or to areas that have the potential for enhancement. This classification indicates that change is needed. The class applies to areas where the naturalistic character has been disturbed to a point where rehabilitation is needed to bring it back into character with the surrounding countryside. It should be considered an interim short-term classification until one of the other objectives can be reached through rehabilitation or enhancement. The desired visual quality objectives should be identified.
- 

Source: After BLM Manual 6310 (U. S. Department of the Interior, Bureau of Land Management, 1975).



## ENCLOSURE 2

### VRM CLASS RATINGS

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"The purpose of a Visual Resource Management (VRM) Class is to reduce the visual impacts of developed activities and to manage the quality of the visual environment."

VRM classes are determined by combining the ratings from scenic quality classes, visual sensitivity levels, and distance zones. Scenic quality classes are rated for landform, water, color, vegetation, intrusions and uniqueness. These elements are combined and the area is quantified as one of the following classes:

Class A - Unique, outstanding features

Class B - Outstanding features common to the physiographic region

Class C - Features common to the physiographic region

Sensitivity levels are determined by frequency of travel through an area, use of area, and public knowledge of the area. These elements are rated and assigned a high, medium or low sensitivity level.

Distance zones are placed in three categories: foreground/middleground zone, background zone, seldom seen zone. The foreground/middleground zone is closer to the view and requires more attention and consideration in management decisions because of the great detail that can be seen in the landscape. The background and seldom seen zones are less detailed to the viewer and most impacts blend with the landscape because of the distance viewed from.

Ratings from scenic quality classes, visual sensitivity levels and distance zones are combined to form VRM classes. The VRM class identifies the suggested degrees of human modification that should be allowed in a certain landscape. See Enclosure 1 for definitions of each VRM class.

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## ENCLOSURE 3

## PUBLIC RESPONSE SUMMARY--CABEZON WSA (NM-010-22)

FAVOR Wilderness Study <sup>a/</sup>			OPPOSE Wilderness Designation or Wilderness Study Status		
I	S		I	S	
18	18		4	9	
I	S	Supporting Reasons	I	S	Supporting Reasons
8	8	Meets Naturalness Criterion	1	6	Does Not Appear to be Natural
8	8	Offers Opportunities for Solitude	3	3	Resources Conflicts
7	7	Offers Opportunities for Recreation	2	2	Not Manageable as Wilderness
3	3	Supplemental Values			
1	1	Resource Conflicts			
8	8	No Supporting Reasons Offered			
I	S	FORM LETTERS & PETITIONS	I	S	FORM LETTERS & PETITIONS
2524	2569	Endorsements of Conser- vationist Proposal			
1	615	Petition Endorsing Con- servationist Proposal			
SEQUENCE NUMBERS			SEQUENCE NUMBERS		
C015	G018	S047	C025		
C016	D014		C011		
K018	K017		L018		
B026	L020		S049		
F014	W033				
L022	H028				
Z003	S035				
C030	S012				
0001	D010				

Note: <sup>a/</sup> I = inputs; S = signatures.



# APPENDIX B

WILDERNESS ANALYSIS REPORT

EMPEDRADO WILDERNESS STUDY AREA

NM-010-063  
ALBUQUERQUE DISTRICT

RIO PUERCO RESOURCE AREA







## SECTION 1

## GENERAL DESCRIPTION

## LOCATION

The Empedrado Wilderness Study Area (WSA; NM-010-063) contains approximately 9,410 acres of public land, and is located about 4 miles northwest of the village of Guadalupe, New Mexico. It is bounded on the north, east and south by maintained roads, and on the west by a combination of maintained roads and property boundaries (refer to Maps B-1 and B-2).

The U.S. Geological Survey topographic maps that cover this WSA are Canada Calladita, Cerro Parido, Guadalupe, and Arroyo Empedrado (7.5 minute quadrangles).

## CLIMATE AND TOPOGRAPHY

The Empedrado WSA lies near the center of northwest New Mexico. Physiographically, the WSA is contained in the Navajo Section of the Colorado Plateau. The Navajo Section is characterized by outcrops of sandstone with lesser amounts of shale that have been subjected to intensive arid-cycle erosion. Regional landforms include mesas, cuestras, rock terraces, retreating escarpments, canyons, and arroyos.

A little over 500 feet of relief exists in the Empedrado WSA, from a low elevation of close to 6,000 feet in Torreon Wash to 6,552 feet on a mesa top. Major drainages include Arroyo Piedra Lumbre, Arroyo Empedrado, Torreon Wash, and Arroyo Chico. The overall geomorphology consists of sandstone hills cut by arroyos.

The Empedrado WSA has a semiarid climate. Warm, relatively dry summers and cold, relatively dry winters are characteristic. The average snowfall is more than 37 inches occurring between October and May. Summer precipitation comes as violent thunderstorms of high intensity, short duration, and extremely unpredictable rainfall patterns, with certain localized areas receiving moisture while adjacent ones receive none. The average annual precipitation is approximately 11 inches, about 40 percent of which falls in July and August.

The temperature, like the precipitation, is extremely variable from season to season. Extreme temperatures range from 102° F in the summer to -20° F in the winter. Average daily temperatures in the warm months vary from 45° F in April to 70° F in July.

The average growing season is approximately 160 days, beginning in May and ending in October. This 160-day season is seldom realized because available moisture, rather than the temperature, is the limiting factor.



# **EMPEDRADO (NM-010-063)**

## **Legend**

- WSA BOUNDARY
- AMENDED BOUNDARY
- LANDS REMOVED FROM WSA STATUS AFTER REINVENTORY
- CONSIDERED FOR SPECIAL DESIGNATION

## **Land Status\***

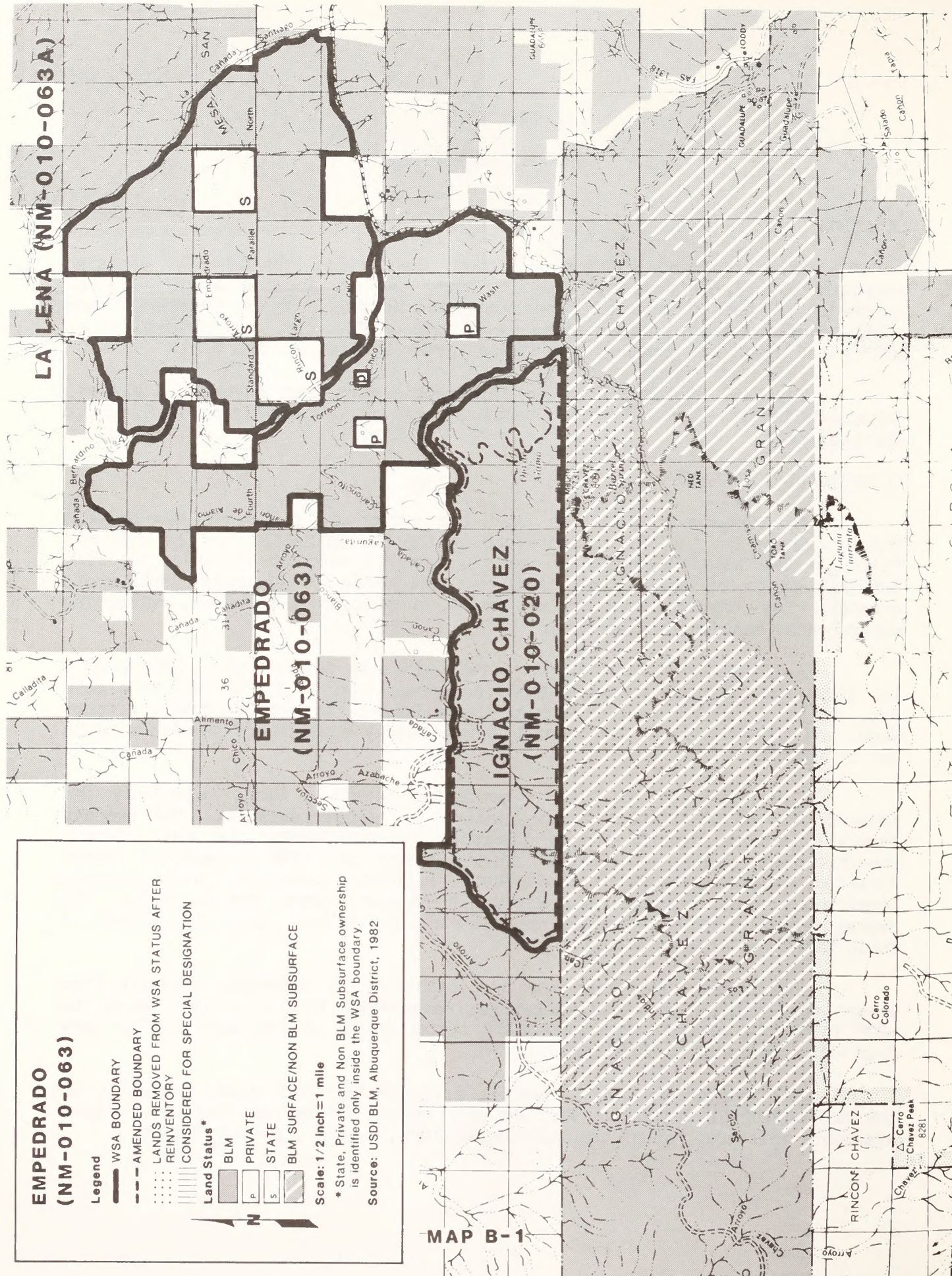
- BLM
- PRIVATE
- STATE
- BLM SURFACE/NON BLM SUBSURFACE

Scale: 1/2 inch=1 mile

\* State, Private and Non BLM Subsurface ownership is identified only inside the WSA boundary

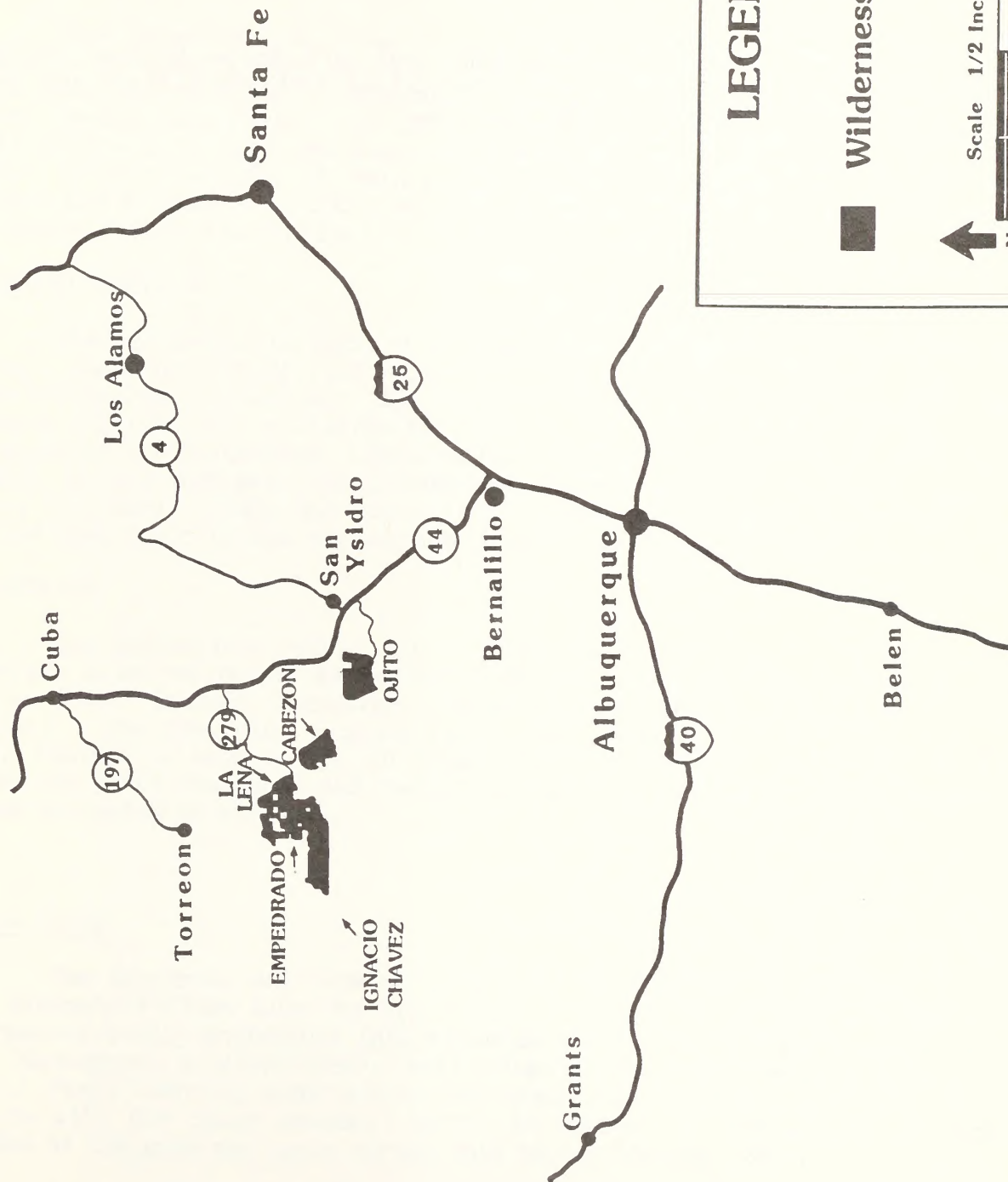
Source: USDI BLM, Albuquerque District, 1982

MAP B-1





# MAP B - 2 GENERAL LOCATION



## LAND STATUS

The Empedrado WSA is made up of 9,410 acres of public land. A total of 260 acres of private inholdings are located inside this WSA (refer to Map B-1).

## ACCESS

Access is available from the west off State Highway 44 and a state-maintained gravel road. County-maintained dirt roads flank the eastern and western boundaries of the Empedrado WSA.



## SECTION 2

## EXISTING RESOURCES

## GEOLOGY

The Empedrado WSA lies in an area of relatively simple structure. Few faults and only gentle folding occur in association with the termination of the McCartys syncline. Regional dip is at a low angle to the northwest towards the San Juan Basin. The Empedrado WSA is situated on the southwestern margin of the basin near the boundary between the Chaco Slope and the Central Basin. In this region of relatively slight deformation and gentle dip, volcanic and sedimentary rocks crop out in many small cliffs and spectacular escarpments. (Refer to Figure 1).

## ENERGY AND MINERALS

The appearance of much of the Empedrado WSA is the result of gently dipping sandstone beds of the Menefee Formation, which form a cuesta-and-valley landscape. The outcropping Menefee rocks represent the uppermost layers of a sedimentary sequence that ranges in age from Pennsylvanian to Cretaceous. Regionally, this sequence is known to contain deposits of oil and gas, coal, uranium, copper, silver, limestone, gypsum, humate, and clay. Table B-1 is a list of the stratigraphic formations and minerals that occur in the sub-surface beneath the Empedrado WSA.

## PALEONTOLOGY

The sedimentary rocks that crop out in the WSA are known regionally to contain a varied fossil assemblage. Of the three exposed rock units, the massive Point Lookout Sandstone contains only trace fossils and plant fragments. The remaining exposed units, the Menefee Formation and Mancos Shale, contain a wide range of fossiliferous material. Occurring in the Menefee are plant fragments and vertebrate material, while the Mancos exhibits a fauna dominated by molluscs.

## WATER

Surface Water

The Empedrado WSA lies in a tributary watershed of the Rio Puerco, which ultimately flows into the Rio Grande. Arroyos in the WSA are seasonal and commonly deeply entrenched into alluvium and shale. Runoff occurs at many times throughout a given year, but volumes vary enormously depending on season. Peaks commonly occur during the summer and early autumn months, which coincide with the rainy season. Up to 99 percent of the annual discharge recorded at the gage may occur during this period (Craig 1980).

Average annual water yields from the WSA fall between 0.1 and 0.5 inches (.25 inches average, or 2,645 acre-feet per year). Yields vary considerably from one year to the next.

Figure 1

**Stratigraphic Section,  
Cabezon, Empedrado, Ignacio Chavez,  
La Lena, and Ojito Wilderness Study Areas**

ERA	SYSTEM OR PERIOD	GROUP	FORMATION OR MEMBER	LITHOLOGY
CENOZOIC	QUATERNARY		PEDIMENT	
	TERTIARY		SANTA FE	
			PICTURED CLIFFS	
	CRETACEOUS	MESAVERDE	LEWIS	
			CLIFF HOUSE	
			MENEFEE	
			POINT LOOKOUT	
			CREVASSE CANYON	
			GALLUP	
			MANCOS	
	JURASSIC	SAN RAFAEL	DAKOTA	
			BRUSHY BASIN	
			WESTWATER CANYON	
			RECAPTURE	
			BLUFF	
			SUMMERVILLE	
			TÓDILTO	
MESOZOIC	TRIASSIC	CHINLE FORMATION	ENTRADA	
			UNNAMED SILTSTONE	
			PETRIFIED FOREST	
			POLEO SANDSTONE LENTIL	
			SALITRAL SHALE TONGUE	
	PERMIAN		AGUA ZARCA	
			SAN ANDRÉS	
			GLORIETA	
			YESO	
			ABO	
PALEOZOIC	PENNSYLVANIAN	MAGDA- LENA	MADERA	
	MISSISSIPPIAN		SANDIA	
	PRECAMBRIAN		ARROYO PENASCO	
			PRECAMBRIAN	
CAM- BRIAN				



TABLE B-1  
MINERAL RESOURCE ASSESSMENT, EMPEDRADO WSA

Mineral Commodity	Geologic Unit	Development Potential
<u>Locatables</u>		
Uranium and thorium	Abo Formation	---
	Morrison Formation	3-B
	Dakota Formation	---
	Mancos Formation	---
Metals (copper, silver molybdenum and gold)	Agua Zarca Member	2-B
	Abo Formation	2-B
	Madera Formation	2-B
Non-metallics (gypsum)	Todilto Formation	3-A
<u>Leasables</u>		
Oil and gas	Sandia Formation	3-C
	Entrada Formation	3-C
	Dakota Formation	3-C
	Mancos Formation	3-C
	Mesa Verde Group	3-C
Geothermal	No specific geologic unit	1-A
Sodium and potassium	No specific geologic unit	2-A
Coal	Mesaverde Group	4-B, NW 1/3
		2-B, SE 2/3
Bituminous rock	No specific geologic unit	2-C
<u>Salables</u>		
Sand and gravel	No specific geologic unit	2-B
Clay (common varieties)	No specific geologic unit	3-A
Humates	Mesaverde Group	4-B, NW 1/3
		2-B, SE 2/3
Petrified wood	Mesaverde Group	2-A
Cinders	No specific geologic unit	2-B

A - Insufficient Data; B - Indirect Evidence; C - Direct Evidence  
D - Abundant Direct and Indirect Evidence

- 1 - The geologic environment and the inferred geologic processes do not indicate favorability for accumulation of mineral resources.
- 2 - The geologic environment and the inferred geologic processes indicate low favorability for accumulation of mineral resources.
- 3 - The geologic environment, the inferred geologic processes, and the reported mineral occurrences indicate moderate favorability for accumulation of mineral resources.
- 4 - The geologic environment, the inferred geologic processes, the reported mineral occurrences, and the known mines or deposits indicate high favorability for accumulation of mineral resources.

Adapted from GEM Study and Turner, BLM, 1982.

Before 1979, Arroyo Chico was an intermittent stream about 4 miles long. The source of intermittent flow was a combination of discharge from a spring located in a channel bottom in Section 36, T. 17 N., R. 5 W., and input from various other springs in smaller tributary arroyos.

In 1979, a deep underground uranium mine near San Mateo began a dewatering process for its operation. Since then, water has been discharged into Arroyo Chico at a constant rate of about 5 to 6 cubic feet per second (2,500 to 3,000 gallons per minute). This water flows from the mine discharge point (which is about 35 stream miles upstream from the gage), past the gaging station and into the Rio Puerco for an undetermined distance downstream (Craig 1980). As a result, flow conditions in the main channel of Arroyo Chico have changed drastically, and it is now a perennial stream.

#### Ground Water

The Empedrado WSA lies within the state-declared Rio Grande Underground Water Basin (1956). Two known springs occur in the WSA, one of which is undeveloped. Three water wells also exist in the WSA.

#### SOILS

The major limitations to soil productivity and use of soils in the Empedrado WSA are susceptibility to erosion, the presence of heavy textural soils derived from shale (some with shallow depths to bedrock), and sodium or alkali content (refer to Table B-2).

#### VEGETATION

The Empedrado WSA is a river-bottom site consisting of the channel and banks of Arroyo Chico and Torreon Wash. Arroyo Chico is now a perennial stream supporting riparian habitat. Refer to Table B-3 and Map B-3 for further information on the vegetation of this WSA. No threatened or endangered plant species have been noted in the Empedrado WSA.

#### WILDLIFE

Two ecotypes in the Empedrado WSA provide habitat for wildlife. The pinyon-juniper type potentially supports 136 vertebrate species, including 3 amphibian species, 64 varieties of birds, 50 species of mammals, and 19 reptile species. Wildlife common to the pinyon-juniper type in the WSA are mule deer, gray fox, golden eagles, ravens, red-tailed hawks, and great horned owls.

The grama-galleta grassland ecotype (which includes some riparian sites) potentially supports 132 vertebrate species. This includes 7 species of amphibians, 68 of birds, 37 of mammals, and 20 of reptiles. Common animals in this ecotype include coyotes, badgers, prairie dogs, scaled quail, horned larks, and kestrels. (A complete list of these animals is located in Run Wild, the USDA Forest Service 1982 computer printout on file in the Rio Puerco Resource Area.) No threatened or endangered wildlife species are known to exist in this WSA.



TABLE B-2  
SOILS, EMPEDRADO WSA

Unit <sup>a/</sup>	Soil Type	Percent Slope	Acres
Ak	Alkali alluvial land	-	757
Bc	Basalt Outcrop - Cabezon Association	-	2,860
Bf	Berent - Sandstone Outcrop Association	-	10
Bg	Billings Silty Clay Loam and Gullied Land	-	5
Cg	Christianburg Clay and Gullied Land	-	648
Fs	Fruitland - Slickspot Association	-	108
Lc	Las Lucas loam	0-5	85
Ld	Las Lucas loam	5-9	377
Le	Las Lucas Soils	5-9	242
Lp	Las Lucas - Persayo Association	-	293
Lt	Litle - Las Lucas - Persayo Association	-	347
Pf	Penistaja Pine Sandy loam	0-5	152
Pr	Persayo gravelly soils - Shale Outcrop Association	-	618
Rt	Rock Outcrop - Travesilla - Persayo Association	-	2,590
Sv	Shavano - Berent Association	-	40
Tp	Travesilla - Persayo - Billings Association	-	278

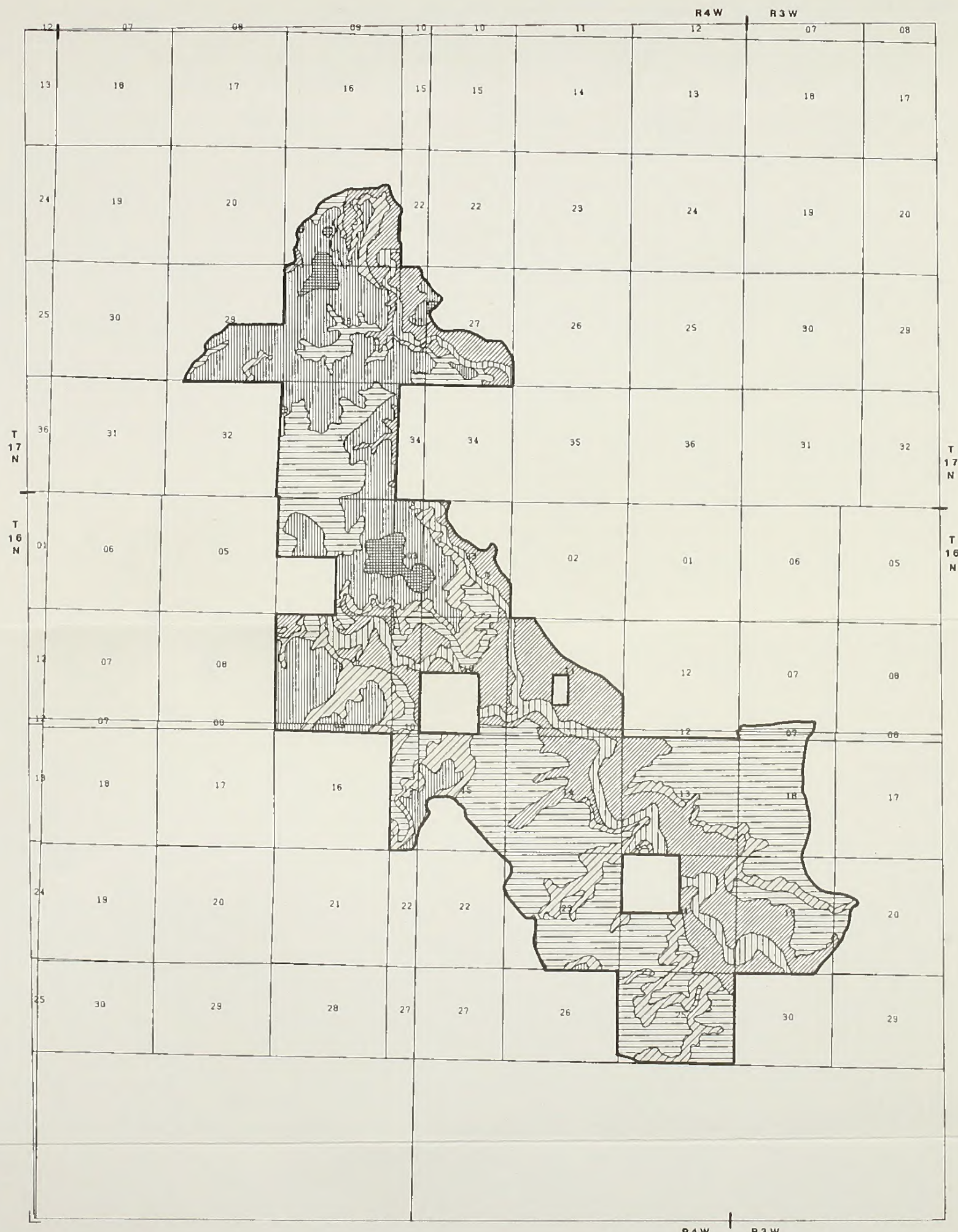
Note: <sup>a/</sup> Units correlate to soils map on file in the Rio Puerco Resource Area.

TABLE B-3  
VEGETATION, EMPEDRADO WSA

Range Site Number	Ecotype	Slope Percent	Aspect	Vegetative Cover (Percent)	Carrying Capacity Acres/AUM	Range Condition	Present Vegetation Species	Potential Perennial Plant Density (%)	Production (lbs/ac)	Potential Vegetation Species	Related Soil Type
1	Juniper-pinyon woodland	10	N, S, E, W	25	12.20	Poor-fair	One-seed juniper, galleta grass, Bigelow sage	15	550	Black grama, little blue-stem, Indian ricegrass, needle and thread grass	190-Rock Outcrop-Travertine Complex
2	Grama-galleta steppe	3	Nearly flat	12	33.60	Poor-fair	Blue grama, broom snake-weed, alkali sacaton	20	80	Indian rice-grass, blue grama, big sagebrush, true mountain mahogany	010-Travertine-Shingle-Rock Outcrop Complex
3	Grama-galleta steppe	Less than 1	S and E				Narrowleaf cottonwood, Rio Grande cottonwood, Russian olive, salt cedar, NM olive, black greasewood, salt grass, alkali sacaton, western wheat-grass, vine mesquite, sedges, spikebrush, horsetail, rush, reed, cattail, bulrush, wolfberry				
4	Juniper-pinyon woodland	4	N, S, E, W	26	9.45	Fair	Galleta grass, alkali sacaton, one-seed juniper	20	450	Indian rice-grass, bottlebrush squirrel-tail, blue grama, galleta grass	141-Penistaja Bond Association
5	Juniper-pinyon woodland	38	N, S, W	14	26.59	Poor	Shadscale, galleta grass, blue grama	10	225-475	Alkali sacaton, sidecoats grama, Indian rice-grass, Bigelow sage	011-Travertine-Shingle-Eroded Rock Outcrop Complex
6	Grama-galleta steppe	Less than 1	N, S, E, W	21	9.85	Poor-fair	Alkali sacaton, four-wing salt-bush, black greasewood	25-30	900	Alkali sacaton, giant blue grama, vine mesquite, galleta grass	Alkali Alluvial Christianburg Clay Gullied land



VEGETATION, EMPEDRADO WSA



RANGE SITE 1 - 2101 ACRES  
RANGE SITE 2 - 160 ACRES  
RANGE SITE 3 - 325 ACRES  
RANGE SITE 4 - 3394 ACRES  
RANGE SITE 5 - 1185 ACRES  
RANGE SITE 6 - 2045 ACRES  
NM-010-063  
SECTIONS



BUREAU OF LAND MANAGEMENT

B-11

MAP B-3





## VISUAL RESOURCES

A visual resource study done for the Proposed Rio Puerco Livestock Grazing Management System Environmental Statement (1978) divided the WSA into three Visual Resource Management (VRM) classes. The southern half having a high scenic quality rating, is designated VRM Class II. The northern half of the WSA, with lower scenic quality, is divided into two classes; the southern portion is rated VRM Class III and the northern portion VRM Class IV (refer to Enclosures 1 and 2 of this appendix).

From lava-capped mesa tops, the Empedrado WSA offers views of Cabezon Peak (VRM Class II), Mesa Cortada, Mesa la Azabache, Arroyo Chico, and the many volcanic plugs that surround Mesa Chivato. Portions of the Cabezon, Ignacio Chavez, and La Lena WSAs can be seen.

## CULTURAL RESOURCES

Cultural resource inventory within the Empedrado WSA consists of surveys of approximately 2 sections (1,280 acres) and numerous small (5-acre or less) in-house and energy-development-related surveys. These limited surveys have identified 24 sites within the WSA boundaries, located generally along and overlooking the two major drainages (Torreon Wash and Arroyo Chico) that bisect the WSA. Identified site types include Archaic, Navajo and Historic. Over half the known sites are unidentified and are carried in BLM site inventory files as locations only. High Pueblo site densities recorded for areas just outside this WSA suggest that substantial evidence of prehistoric pueblo occupation exists within this WSA.

Existing surveys have reported only one Archaic site, located above Canada de Las Lomitas on the north side of the WSA, but the probability of Archaic sites within this WSA is high.

Seven Navajo sites are recorded within the WSA, six of which are habitation sites. Little temporal data is available for these Navajo sites (none have been tested). Ethnohistorical information indicates Navajo occupation of the middle Rio Puerco Valley (and the WSA) occurred both before and after the Long Walk Period (1864-1868).

Historic use of the middle Rio Puerco drainage (and therefore the WSA) has been moderately extensive (refer to Table B-4). Spanish settlers entered the valley before the 18th century, and remnants of a Hispanic population remain today. Two historic sites are recorded within the WSA, one being a Historic Spanish structure and the other a Historic trash scatter. Traditional uses included livestock grazing and farming.

## AIR QUALITY

Under the Clean Air Act (as amended, 1977), BLM-administered lands were given a Class II air quality rating, which allows moderate deterioration associated with moderate, well-controlled industrial and population growth.

TABLE B-4

ARCHAEOLOGICAL SEQUENCE FOR RIO PUERCO RESOURCE AREA  
(after Dittert, 1959)

Cultural Type	Time	Cultural Period	Time
PaleoIndian	Before 250 B.C.	Pueblo II	870-950 A.D.
Archaic	Before 250 B.C.- 700 A.D.	Pueblo II	950-1100 A.D.
	(500-700 BMIII)	Pueblo III	1100-1200 A.D.
Basketmaker	700-800 A.D.	Pueblo III-IV	1200-1400 A.D.
		Pueblo IV	1400-1600 A.D.
Pueblo I	800-870 A.D.	Pueblo V	1600-Recent



## SECTION 3

## EXISTING AND POTENTIAL USES

## MINERAL DEVELOPMENT

No exploration or development activity associated with locatable, leasable or salable minerals is occurring within the boundaries of the Empedrado WSA. As of August 1982, a total of 331 mining claims have been staked within the WSA and 22 oil and gas leases issued. No active mines or wells exist within WSA boundaries.

Table B-1 (Section 2) indicates the highest potential for development is associated with the coal and humates that occur in the Mesaverde Group. The geologic environment, inferred geologic processes, reported mineral occurrences, and deposits indicate a high favorability for the accumulation of these two mineral resources. The completion of a successful exploration program could lead to the development of a moderate-sized coal strip mine in the northern half of the WSA. All other commodities have only a low to moderate potential for development.

## WATERSHED

Arroyo Chico, which is part of the Rio Puerco, drains the Empedrado WSA. The Rio Puerco watershed is one of the major tributaries of the Rio Grande, embracing approximately a third of the drainage that lies in New Mexico above the Elephant Butte Reservoir. The Rio Puerco supplies one-sixteenth of the waters of the Rio Grande (6 percent), yet it is the source of over half (56 percent) of the sediment that obstructs the main Rio Grande channel (Waite 1972). The main drainage bottoms of the WSA are in the latter stages of an erosion cycle that was apparently initiated by cattle and sheep overgrazing in the late 1800's and early 1900's. The average rate of erosion for the WSA is moderate.

## LIVESTOCK GRAZING

Five grazing allotments occur in this WSA (refer to Map B-4); all of them have acreage in other WSAs. The WSA supports approximately 1,340 Animal Unit Months. Table B-5 displays grazing information pertaining to these five allotments, and the allotment discussions give number of range improvements and Allotment Management Plan (AMP) information.

Most of the ranchers holding leases in the WSA ranch as a second income or to continue family tradition; ranching is not their primary source of income. Most of them live in Albuquerque or Bernalillo near their jobs and primary sources of income. Therefore, the weekends are the time when they can attend to their grazing allotments, and the pickup truck has partially replaced the horse as a major livestock management tool.

TABLE B-5  
RANGE ALLOTMENT INFORMATION

Allotment Name	Number	Total Acres	WSA Acres	Number of Permittees	Authorized Livestock Use	Season of Use
Chico Crossing	0043	15,339	5,057	2	170 head	Yearlong
Torreon Wash	0035	7,976	1,486	1	88 head	Yearlong
Arroyo Empedrado	0036	4,536	2,609	2	59 head	Yearlong
Cerro Cuate	0041	3,886	258	1	58 head	Yearlong

Chico Crossing Allotment (#0043)

No range improvements are proposed for construction.

Torreon Wash Allotment (#0035)

Three of the five pastures in this allotment overlap the Empedrado WSA. These three pastures are grazed by livestock for 7 months each year. No range improvements are needed in the Empedrado WSA to implement the AMP.

Arroyo Empedrado Allotment (#0036)

All three pastures in this allotment have acreage in the Empedrado WSA. To implement the AMP, approximately 1 mile of drift fence along the west bank of Torreon Wash would need to be developed within the WSA.

Cerro Cuate Allotment (#0041)

All range improvements needed to implement the AMP are in place. No additional improvements are proposed for the portion of this allotment within the Empedrado WSA.

FOREST PRODUCTS

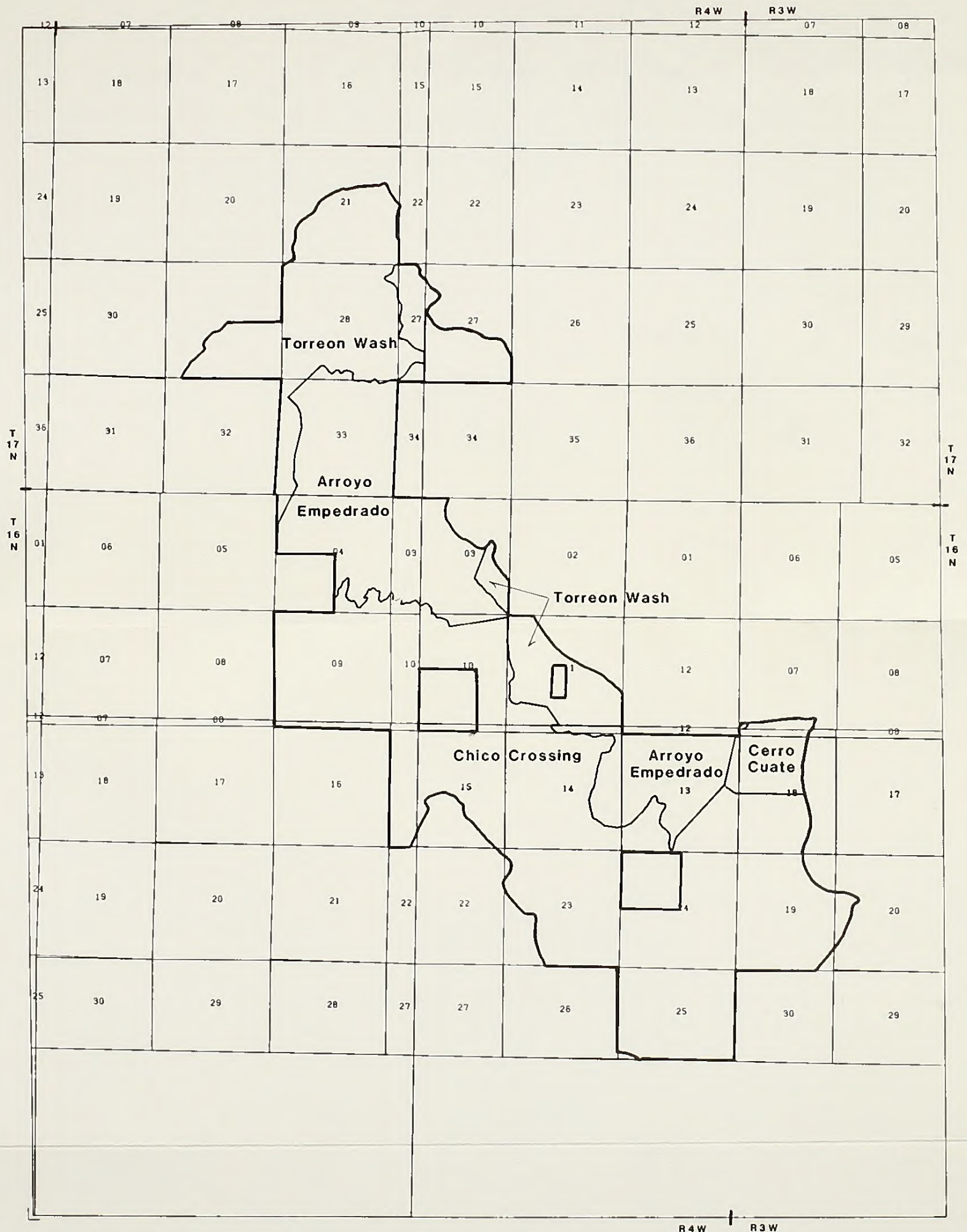
Pinyon-juniper woodland is the dominant forest type in the WSA. In the WSA, this type is of no commercial value and of little fuelwood value because of its low stand density. Some illegal woodcutting does occur.

RECREATION

The BLM has no visitor use data for the Empedrado WSA. The primary recreation use is believed to be some big game hunting and its associated activities -- camping, ORV use, and hiking. Letters received by the BLM show



# RANGE ALLOTMENTS, EMPEDRADO WSA



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R 4 W R 3 W

SECTIONS  
ALLOTMENTS  
NM-010-063



BUREAU OF LAND MANAGEMENT

MAP B-4

B-17





that scenic and geological sightseeing also occur in this WSA, particularly in the southern third of the WSA. The Continental Divide National Scenic Trail is presently proposed to pass through the southern portion of the Empedrado WSA.

The BLM's 1971 Unit Resource Analysis utilized the Recreation Information System (RIS) to describe the existing recreation environment. The RIS is an evaluation that rates the quality of experience a visitor can expect while participating in a specific activity. The Empedrado WSA lies within the Chico Arroyo RIS unit. Table B-6 describes the key factors for each activity evaluated and its quality rating.

TABLE B-6

## RECREATION QUALITY EVALUATION

Activity	Quality Rating in Chico Arroyo	
	Unit	Key Factors
ORV Use	High	Soil, size, hazards, usability
Sightseeing (Scenery)	Medium	Landform, color, water, vegetation, uniqueness, intrusions
Primitive Values	Low	Scenic qualities, size, intrusions, wildlife, fisheries, water usability, uniqueness

## EDUCATION/RESEARCH

Educational-interpretive potential exists in the Empedrado WSA in the form of a "natural laboratory" for the observation and study of natural systems. These values are concentrated in the south one-third of the WSA, and include several cultural sites as well as the riparian habitat located along Arroyo Chico.

## NATIVE AMERICAN USES

Native Americans (particularly nearby Navajo, Jemez, Zia and Santa Ana peoples) have traditionally used the Empedrado WSA and continue some use today for firewood gathering and hunting. A recent survey near the WSA and interviews with officials of the Jemez, Zia, and Santa Ana Pueblos and the Canyoncito Navajo Reservation generally show that many places of religious significance exist in or near the Empedrado WSA, but that specific site

locations are not known to the lay members of the tribes. Tribal elders know of and watch over such sites, and it would apparently be indiscreet for the secular governments to propose a survey or to provide any information of such an esoteric nature. Traditional uses of this WSA will probably continue.

#### WILDLIFE

The southern portion of the WSA is used as winter range for deer from the Mesa Chivato. A small yearlong deer population is present.

Consumptive use of wildlife in the WSA includes some deer hunting, small game hunting, and trapping (primarily of coyotes). Non-consumptive use includes observation of wildlife incidental to sightseeing.

A wildlife habitat management plan for the Empedrado WSA proposes the construction of several enclosure fences with wildlife watering devices. These enclosures would help provide small plots of land with water, cover, and forage for small animals.



## SECTION 4

## WILDERNESS CRITERIA

## EVALUATION OF WILDERNESS VALUES

Quality of Mandatory Wilderness Characteristics

The basic wilderness characteristics of the Empedrado WSA have been documented in the process of designating it as a Wilderness Study Area (USDI, BLM 1980). The following discussion elaborates on the quality of these characteristics.

## Naturalness

The human imprints in the Empedrado WSA include a fenceline network, a spring development, 9 earthen dams, sections of rusted drill pipe, 3 abandoned drillpads, a painted rock, 7 shotholes, and 31 routes. All are described in the Wilderness Intensive Inventory (USDI, BLM 1980), which also includes a discussion on the relative impacts of each individual intrusion on naturalness and, in some cases, the rehabilitation potential of the intrusions.

The Empedrado WSA is sparsely impacted by the actions of man, and all existing intrusions are well-buffered by the surrounding vegetation and/or topography. No single impact has an excessive visual impact from a north, south, east, or west viewscape. When the visitor views the Empedrado WSA as a whole, it generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable (USDI, BLM 1980).

## Solitude

The BLM considers solitude as the state of being alone, removed from habitation, or in isolation. The broken terrain of the Empedrado WSA, including the mesa, rolling grasslands, and arroyos and washes, combined with the pinyon-juniper cover in the northwestern portion of the WSA, buffers user groups from each other and thus provides opportunities for solitude. However, the physical narrowness of the northern two-thirds of the WSA limits the opportunities to experience solitude. Low levels of visitor use concentrated in this portion could be tolerated and still provide the experience of solitude, though the experience would be less than outstanding.

## Opportunities for Primitive and Unconfined Recreation

The BLM defines primitive and unconfined recreation as the potential a WSA has to provide opportunities for a diversity of possible activities, or one activity of outstanding quality. The Empedrado WSA contains some opportunities for hunting and sightseeing, but the overall quality of primitive opportunities has been rated low, as displayed in Table B-6 (Recreation Quality Evaluation). Overall, opportunities for primitive recreation are not outstanding.

## Special Features

The Empedrado WSA has special cultural, scenic, wildlife and vegetation features concentrated in the southern one-third of the WSA (refer to Figures 2 and 3). Although wildlife is not abundant, a good diversity of species is present. This diversity is expanded by the riparian vegetation along Arroyo Chico (refer to Figures 4 and 5). Several cultural sites have been noted, including petroglyphs. Expansive scenic vistas of the surrounding landscape features are provided from the mesas in this WSA (refer to Section 2, Visual Resources).

## Multiple Resource Benefits

The Empedrado WSA contains many natural values as a result of its relatively undisturbed character. Congressional designation as wilderness would carry the weight of law and would provide a greater degree of long-term protection for these natural values than would the administrative designations available to the BLM. (A more detailed discussion of the multiple resource benefits of wilderness designation may be found below in Section 6 in the discussion of impacts of the All Wilderness Alternative.)

## Diversity In The National Wilderness Preservation System

### Ecotypes Present

The Empedrado WSA, according to Robert G. Bailey (USDA, FS 1980), falls under Dry Domain in the Highland Province and the Colorado Plateau Sub-Province. This Sub-Province can be further subdivided into the Grama-Galleta Steppe and Juniper-Pinyon Woodland Mosaic ecotypes (Kuchler 1964).

Gramma-Galleta Steppe. Total acres in the WSA are 2,264 (24 percent of the WSA).

Juniper-Pinyon Woodland Mosaic. Total acres in the WSA are 7,146 (76 percent of the WSA).

Map B-5 displays these ecotypes. Vegetation Map B-3 breaks each ecotype into more refined site categories that are narrated in Table B-3 (Vegetation) located in Section 2 (Existing Resources).

## Distance from Major Population Centers

The Empedrado WSA is within a day's drive (5 hours) of Bernalillo County and part of Sandoval County, which have been identified in the 1980 census (USDC, BC 1981) as a Standard Metropolitan Statistical Area.

## MANAGEABILITY

To be recommended as suitable, the Empedrado WSA must be capable of being effectively managed as wilderness. To determine manageability, the BLM must consider such factors as private inholdings, state lands, valid existing rights, mineral leases, rights-of-way, topography, and the overall land status pattern.





Figures 2 and 3 - These photos of the Empedrado WSA show the sculptured scenic beauty of public lands in the Rio Puerco Valley.







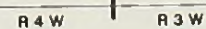
Figure 4 - The tamarisk-filled Arroyo Chico gives way to the near-vertical sandstone bluffs of the Empedrado WSA. These scenic resources are overshadowed by the ever-present local landmark -- Bear's Mouth (on the Ignacio Chavez WSA).



Figure 5 - This photo presents the southern portion of the Empedrado WSA; this portion is being recommended for Special Designation. The winding Arroyo Chico in the middleground carves its way through the Rio Puerco Valley as grassy canyons cut deeply into the foothills of Mesa Chivato in the background.



R 4 W      R 3 W



1.3 0 MILE 1.3



BUREAU OF LAND MANAGEMENT





Under wilderness management, reasonable access would be guaranteed to inholdings in the Empedrado WSA. Based on present use, these access needs would result in the occurrence of generally low levels of use incompatible with wilderness.

The configuration of the northern two-thirds of the Empedrado WSA does not lend itself to effective management. The WSA is extremely narrow, and flanked primarily by state and private land. A quarter-section of private land further breaks up the contiguous pattern.

The southern two-thirds of the WSA contains a quarter-section of private land, but is organized in a much more manageable land pattern. It is surrounded primarily by public land. However, this more manageable portion of Empedrado WSA is less than 5,000 acres in size (refer to Map B-1).





## SECTION 5

## PUBLIC INVOLVEMENT OVERVIEW

This report has been prepared using public input obtained by large mailings, public meetings, open houses, and personal contacts. These efforts began during wilderness inventory and will continue during the preparation of the statewide wilderness EIS.

Those people supporting WSA status for the Empedrado cited as justification its natural character, opportunity for solitude, and opportunity for primitive and unconfined recreation. Cultural and visual supplemental values were also noted.

Opponents of WSA designation discussed the effects of excluding the Empedrado WSA from possible future mineral exploration and development, the presence of human impacts, and possible limitations placed on ranch operations. (Refer to the public response summary from the wilderness intensive inventory, Enclosure 3 to this appendix.)

During the public comment period on the Albuquerque District Wilderness Draft EA (DEA -- USDI, BLM 1983), 29 public inputs were received on the Empedrado WSA. Ten inputs expressed opposition to wilderness designation. These commentors cited a lack of naturalness, and a high favorability for coal and humate, as well as a moderate favorability for uranium, thorium, oil and gas.

Nineteen inputs favored wilderness designation, stating that the Empedrado WSA contains outstanding opportunity for primitive recreation and solitude, and could be easily managed for wilderness. Resource conflicts generated by possible wilderness designation were not considered significant. One commentor felt the No Wilderness Alternative (with Area of Critical Environmental Concern designation to protect visual values) is not adequate to protect the WSA's scenic values.

Miscellaneous comments suggested combining the southern portion of Empedrado WSA with the eastern portion of the Ignacio Chavez Wilderness Study Area. It was also suggested that the Draft EA does not adequately recognize high uranium and oil and gas potential of Empedrado WSA, but no further data has been submitted to change the original assessment.





## SECTION 6

## ALTERNATIVES AND IMPACTS

This section discusses two alternatives for the Empedrado WSA: the All Wilderness Alternative, and the No Action Alternative (manage under the existing land use plan). The BLM has also considered other alternatives for this WSA which were not found to be reasonable or beneficial; therefore, these alternatives were dropped.

## ALL WILDERNESS ALTERNATIVE

Under this alternative, the entire 9,410 acres of public land within the Empedrado WSA would be recommended as suitable for wilderness designation. If the WSA was designated as wilderness, existing and potential uses would be regulated by the BLM's Wilderness Management Policy (USDI, BLM 1981).

Impacts on Wilderness

Wilderness values would be retained and protected over the long term under the Wilderness Management Policy. Under the All Wilderness Alternative, the impacts to wilderness values would be significantly beneficial because of the added protection of congressional designation.

Impacts on Minerals

At least a moderate favorability exists in the Empedrado WSA for the occurrence of copper, silver, uranium, thorium, gypsum, bituminous rock, sand, gravel, clay, and petrified wood, and a high favorability for humate and coal. Wilderness designation would curtail exploration and prevent possible future extraction of these mineral commodities. However, under current economic conditions, little demand exists for the extraction of copper, silver, uranium, thorium, bituminous rock, molybdenum, gold, or clay from the Empedrado WSA's reserves.

Gypsum, sand, gravel, and humates occur throughout northern New Mexico; any of these resources located in the Empedrado WSA would be considered economically attractive regionally. This is because extraction near the source of utilization is essential to achieving an acceptable profit margin.

Assuming favorable economic conditions, sufficient coal is present that a moderate-sized coal mine could be developed in the WSA. This option would be precluded by wilderness designation.

Wilderness designation would significantly impact the potential for development of all locatable and leasable mineral commodities that may occur within the Empedrado WSA.

## Impacts on Other Resources and Uses

The All Wilderness Alternative would not have significant impacts on air quality and realty actions in the Empedrado WSA. For this reason, these resources are not included in the following discussions.

### Soils, Watershed and Vegetation

Restrictions on surface-disturbing and mechanized activities would provide long-term protection for watershed, soils, and vegetation. Impacts would be significantly beneficial under the All Wilderness Alternative.

### Wildlife

Restrictions on surface-disturbing activities and mechanized activities would help prevent decreases in wildlife populations. Wilderness designation would place restraints on methods of animal damage control, the construction of fence exclosures and watering devices. Overall, impacts for wildlife under this alternative would not be significant.

### Visual Resources

The Empedrado WSA's outstanding visual resources would be protected. Minor modifications in the basic elements of the landscape could occur as a result of natural ecological changes, and management activity would be restricted to minimal levels of visual modifications. As the result of these management restrictions, no significant impacts are anticipated.

### Cultural Resources

Site-condition monitoring associated with surveillance could prove beneficial because 80 percent of the Rio Puerco Resource Area's known sites suffer from significant natural deterioration. Enhanced monitoring would increase the ability to detect, and if warranted, to arrest serious deterioration at a relatively early stage.

Potential conflicts exist between cultural resources management and the wilderness management policy, which allows the natural decay of sites. Excavation and stabilization may be permitted on a case-by-case basis where the project will not degrade the overall wilderness character and when such activity is needed to preserve the particular cultural resource. If such activity is disallowed on some sites, they may deteriorate.

Limited surface-disturbing activities would be allowed under wilderness designation. This could limit the destruction of cultural sites through other than natural causes. Overall, wilderness designation would have little impact on cultural resources.

### Livestock Grazing

The existing level of livestock grazing would continue in the Empedrado WSA under wilderness designation. Wilderness designation would not prevent any increase in Animal Unit Months based on Allotment Management Plans (AMPs).



However, livestock operations in this WSA would be affected to some degree--though not significantly--by wilderness designation, as the result of limitations imposed on the maintenance of existing range improvements. Although grazing is a permissible and compatible activity with wilderness, limitations on the type of construction materials, location of new improvements, and extent of vehicular access may occur in order to protect wilderness characteristics. Presently, the only range improvement proposed for construction in the WSA is a half-mile of drift fence.

An impact to those allottees holding grazing leases within the Empedrado WSA could be the limitations put on the use of motorized vehicles in designated wilderness areas. Wilderness designation could hinder the effective use of limited time to tend to weekend ranching operations through restricting vehicular use.

The pipeline system proposed in the AMPs for allotments in the Empedrado WSA will not be constructed. The BLM final range improvement policy (dated October 15, 1982) eliminated the pipeline construction base funding.

#### Forest Products

It is assumed that increased management attention (such as regular patrol) would occur under wilderness designation, and that this patrolling could curtail illegal woodcutting. Under this alternative, no significant impact would occur to forest products, because the WSA's woodlands are considered to have little or no commercial value.

#### Recreation

Recreation activities that require motorized vehicles would be curtailed, including some hunting and motorcycle activity. Off-road vehicle use would not be permitted, significantly impacting this type of use in an area ranked as being of high quality for ORV use.

Wilderness designation would ensure that the present opportunities for sightseeing, photography, and hiking would continue. Although these opportunities exist outside the WSA, the southern third of Empedrado provides the natural setting on which the existing recreation opportunities are dependent. Primitive recreation activities would not be significantly impacted by this alternative.

#### Education/Research

Wilderness designation would ensure the preservation of the "natural laboratory" in the Empedrado WSA. This preservation would be a significantly beneficial impact to education and research.

## Native American Uses

The limitations on vehicular access could alter current Native American uses. However, the preservation of solitude and naturalness could enhance those activities dependent on a natural setting. This impact is unquantifiable.

## NO ACTION ALTERNATIVE

In the Draft Environmental Assessment, the Wilderness Analysis Report for this WSA (Appendix B) included an alternative to amend the existing land use plan (the No Wilderness Alternative). Since the Draft's publication in March 1983, a comprehensive land use planning effort has been initiated in the Rio Puerco Resource Area. This effort is called a Resource Management Plan (RMP). The Empedrado WSA is now being considered in the tentative alternatives of the RMP as a Special Designation Area. As a result, the scope of the No Action Alternative for this WSA has been changed to include the previously separate No Wilderness Alternative.

Until Congress makes its decision on wilderness designation, the WSA will be managed under the Final Interim Management Guidelines for Lands Under Wilderness Review (USDI, BLM 1983). If Congress designates it as wilderness, the WSA will be managed under the Wilderness Management Policy (USDI, BLM 1981).

If the WSA is not designated as wilderness, it will be managed under the No Action Alternative, which would involve management under other than wilderness policy. Management would follow the guidelines of the Rio Puerco RMP.

The RMP is expected to be approved in late 1985 while the wilderness study process is still underway. Therefore, the RMP decision concerning this WSA may be incorporated into the Wilderness Study Report to be written later in this process. The tentative RMP proposal for the Empedrado WSA currently emphasizes the management of this area for visual values. If the approved RMP does not include a special designation for any portion of the Empedrado WSA, the WSA would be managed under the No Action Alternative according to multiple use concepts without stressing visual values.

The most probable uses of the Empedrado WSA would be livestock grazing, mineral exploration, and ORV use.

## Impacts on Wilderness

Mineral exploration and development, increased ORV activity, and greater use of motorized vehicles would result in disruption of wildlife habitat, scenery, and vegetation as well as reduce the opportunity to experience solitude or primitive and unconfined recreation. Over time, all of these uses could be expected to significantly impact naturalness. The fragile special features of the WSA (cultural, scenic, wildlife, and vegetation) would be particularly vulnerable to development-oriented management.



To date, no protective designation has been proposed for the Empedrado WSA. The cumulative effect of this lack and the above management practices would be a significant impact on the Empedrado WSA's wilderness values.

#### Impacts on Other Resources and Uses

The No Action Alternative would have no significant impacts on forest products, air quality, realty actions, livestock grazing, visual resources, or minerals. For this reason, these resources are not included in the following discussions.

##### Soils, Watershed, Vegetation

Continued vehicular access and other surface-disturbing activities from potential mineral development could result in additional ruts and create the potential for reduced watershed quality. This occurrence would also degrade soils and vegetation, resulting in significant impacts because the soils in the Empedrado WSA have a high susceptibility to erosion.

##### Wildlife

Non-wilderness management could result in increased human activity, thus impacting those wildlife species dependent on a predominantly unmodified ecosystem. However, a wider range of habitat management actions could occur under this alternative than under wilderness management; in the long run, a more diverse habitat for wildlife could be produced. No significant impacts are anticipated to wildlife under this alternative.

##### Cultural Resources

Continued vehicular access would allow the potential for vandalism, but would also provide for more frequent vehicular patrol and monitoring. Cultural resources would be vulnerable to surface-disturbing activities. These impacts could be mitigated by a wide variety of management options other than wilderness, such as withdrawals and closures, as well as specific site or area cultural resource management plans. The No Action Alternative would have little impact on cultural resources.

##### Recreation

Opportunities for primitive and unconfined recreation would be reduced by mineral development, because such recreation relies on the resource base of a predominantly natural environment. Therefore, a limited primitive recreation option would exist under the No Action Alternative with mineral or other authorized development occurring in the WSA.

Recreation relying on vehicular travel, as well as motocross use, would continue. However, this opportunity is readily available throughout the majority of the Rio Puerco Resource Area.

Overall impacts to the recreation resource under this alternative would not be significant because the potential for mineral development in the Empedrado WSA is considered to be low to moderate.

### Education/Research

The natural setting supporting the special features (e.g., wildlife, cultural, and scenic) may be subject to surface disturbance and vehicular travel. This would significantly impact the Empedrado WSA's potential for use as a "natural laboratory". (Refer to Section 3, Existing and Potential Uses -- Education and Research.)

### Native American Uses

The natural settings in which Native American uses are often conducted could be subject to surface-disturbing activities. The impact of this alternative on Native American uses is unquantifiable.



## ENCLOSURE 1

### CRITERIA FOR VISUAL RESOURCE MANAGEMENT CLASSES

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- Class I - Applies only to classified special areas, e.g., roadless, wilderness, primitive, natural areas, etc. This quality standard is established through legislation or policy. Only natural ecological changes are allowed.
- Class II - Landscapes with Class A scenery quality, or Class B scenery quality in the foreground/middleground zone with high visual sensitivity. Changes in any of the basic elements (form, line, color or texture) caused by a management activity should not be evident in the characteristic landscape.
- Class III - Landscapes with Class B scenery quality and high visual sensitivity in the background visual zone, or with Class B scenery quality and medium visual sensitivity in the foreground/middleground visual zone or with Class C scenery of high visual sensitivity in the foreground/middleground zone. Changes in the basic elements (form, line, color, texture) caused by management activity may be evident in the characteristic landscape. However, the changes should remain subordinate to the visual strength of the existing character.
- Class IV - Landscapes with Class B scenery quality and high visual quality sensitivity in the seldom seen visual zone, or with Class B scenery quality and medium or low visual sensitivity in the background or seldom seen zones, or with Class C scenery quality (except with high sensitivity in the foreground/middleground zone). Changes may subordinate the original composition and character but must reflect what could be a natural occurrence within the characteristic landscape.
- Class V - Applies to areas identified in the scenery quality inventory where the quality class has been reduced because of unacceptable intrusions, or to areas that have the potential for enhancement. This classification indicates that change is needed. The class applies to areas where the naturalistic character has been disturbed to a point where rehabilitation is needed to bring it back into character with the surrounding countryside. It should be considered an interim short-term classification until one of the other objectives can be reached through rehabilitation or enhancement. The desired visual quality objectives should be identified.
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Source: After BLM Manual 6310 (U. S. Department of the Interior, Bureau of Land Management, 1975).

## ENCLOSURE 2

### VRM CLASS RATINGS

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"The purpose of a Visual Resource Management (VRM) Class is to reduce the visual impacts of developed activities and to manage the quality of the visual environment."

VRM classes are determined by combining the ratings from scenic quality classes, visual sensitivity levels, and distance zones. Scenic quality classes are rated for landform, water, color, vegetation, intrusions and uniqueness. These elements are combined and the area is quantified as one of the following classes:

Class A - Unique, outstanding features

Class B - Outstanding features common to the physiographic region

Class C - Features common to the physiographic region

Sensitivity levels are determined by frequency of travel through an area, use of area, and public knowledge of the area. These elements are rated and assigned a high, medium or low sensitivity level.

Distance zones are placed in three categories: foreground/middleground zone, background zone, seldom seen zone. The foreground/middleground zone is closer to the view and requires more attention and consideration in management decisions because of the great detail that can be seen in the landscape. The background and seldom seen zones are less detailed to the viewer and most impacts blend with the landscape because of the distance viewed from.

Ratings from scenic quality classes, visual sensitivity levels and distance zones are combined to form VRM classes. The VRM class identifies the suggested degrees of human modification that should be allowed in a certain landscape. See Enclosure 1 for definitions of each VRM class.

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## ENCLOSURE 3

## PUBLIC RESPONSE SUMMARY--

EMPEDRADO WSA (NM-010-63)

FAVOR <u>Wilderness Study</u> <sup>a/</sup>			OPPOSE <u>Wilderness Designation or Wilderness Study Status</u>		
I	S		I	S	
10	10		4	9	
I	S	<u>Supporting Reasons</u>	I	S	<u>Supporting Reasons</u>
3	3	Meets Naturalness Criterion	1	6	Does Not Appear to be Natural
3	3	Offers Opportunities for Solitude	1	1	Range Impacts
3	3	Offers Opportunities for Recreation	1	1	Resource Conflicts
1	1	Manageable as Wilderness	1	1	Not Manageable as Wilderness
7	7	No Supporting Reasons Offered	1	1	No Supporting Reasons Offered
I	S	<u>FORM LETTERS &amp; PETITIONS</u>	I	S	<u>FORM LETTERS &amp; PETITIONS</u>
2524	2569	Endorsements of Conser- vationist Proposal			
1	615	Petition Endorsing Con- servationist Proposal			
<u>SEQUENCE NUMBERS</u>			<u>SEQUENCE NUMBERS</u>		
C015	L020	S047	M025		
K018	W030		C025		
F014	H028		C011		
F022	S035		0001		
K017	D010				

Note: <sup>a/</sup> I = inputs; S = signatures.





# APPENDIX C

WILDERNESS ANALYSIS REPORT

IGNACIO CHAVEZ WILDERNESS STUDY AREA

NM-010-020  
ALBUQUERQUE DISTRICT

RIO PUERCO RESOURCE AREA

IGNACIO CHAVEZ







## SECTION 1

### GENERAL DESCRIPTION

#### LOCATION

The Ignacio Chavez Wilderness Study Area (WSA; NM-010-020) contains approximately 9,961 acres of public land. The WSA is bounded on the north and west by public and private land, on the south by the Ignacio Chavez Land Grant (public land), and on the east by other public land (refer to Map C-1).

The Ignacio Chavez WSA is located approximately 6 miles west of the village of Guadalupe, New Mexico, and 50 air miles northwest of Albuquerque. The WSA is adjacent to the Empedrado and La Lena WSAs (refer to Map C-2).

The U.S. Geological Survey topographic maps that cover this 9,961-acre area are: Mesa Cortada, Cerro Parido and Guadalupe (7.5-minute quadrangles).

#### CLIMATE AND TOPOGRAPHY

The Ignacio Chavez WSA is situated on the physiographic boundary between the Navajo and Datil Sections of the Colorado Plateau Physiographic Province. The Navajo Section includes much of the northern part of the WSA, and is characterized by outcrops of sandstone with lesser amounts of shale that have been subjected to intensive arid-cycle erosion. Landforms common to this part of the WSA include mesas, cuestras, rock terraces, volcanic plugs, retreating escarpments, canyons and arroyos. These landforms are in striking contrast to the southern portion of the WSA, which is contained within the Datil Section of the Colorado Plateau Province. Cenozoic Age volcanism created most of the Datil Section landforms, which include basalt plains, cinder cones, exhumed plugs and dikes, and extensive talus slopes.

Relief varies throughout the WSA from low-relief mesa tops to high-relief escarpments along plateau edges. The highest elevation is approximately 7,731 feet at Bear's Mouth, while the lowest elevation (approximately 6,000 feet) is found near the Arroyo Chico drainage.

Three principal landforms occur within the boundaries of the Ignacio Chavez WSA. These include: (1) the lava-covered surface of El Banquito Mesa, (2) the talus-covered slopes along the mesa edge, and (3) the incised cuesta topography that characterizes the remainder of the WSA.

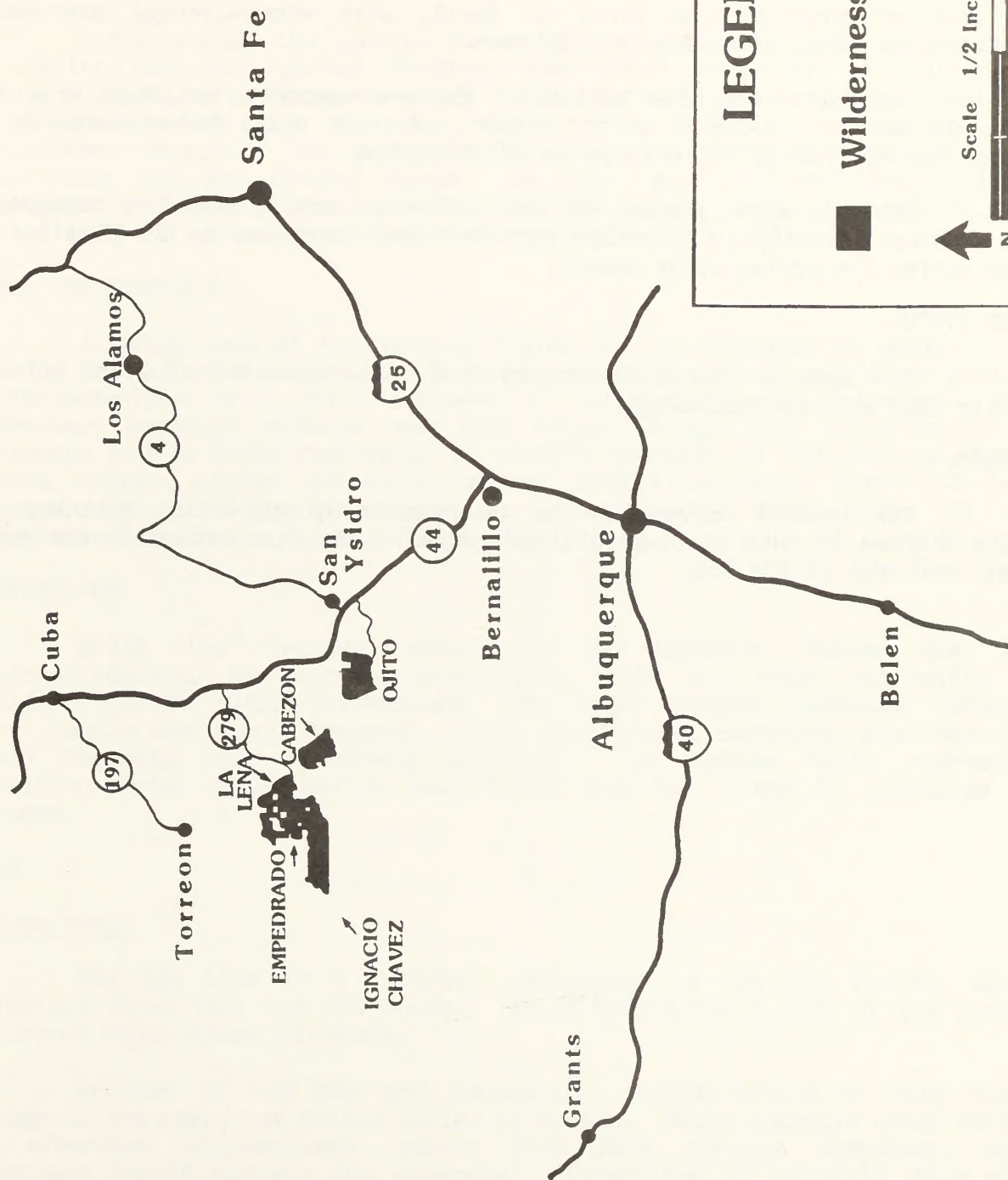
The WSA has a semiarid climate with pleasant summers and fairly long, cold winters. The summer growing season rains account for approximately 65 percent of the total annual precipitation (15 percent falling during April, May, and June and 50 percent during July, August, and September). During the summer, drought periods occur with interspaced torrential showers that cause rapid runoff on open slopes and flash floods in the valleys and arroyos. The winters are dry; most moisture is snow, with some sleet and rain.





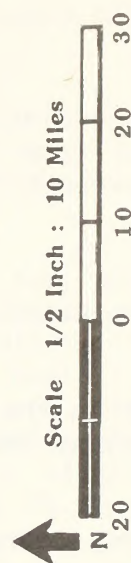


# MAP C-2 GENERAL LOCATION



## LEGEND

Wilderness Study Area



Average annual precipitation is approximately 11 inches. The amount and distribution of precipitation is extremely variable. A measurable amount of snow can be expected at any time between October 1 and April 30; the average snowfall is 37 inches.

The average growing season is approximately 153 days, beginning at the end of March or the first of April, with above-average over-winter moisture and often extending into October.

Temperature is also variable. Extreme temperatures range from 102° F in the summer to -20° F in the winter. Average daily temperatures in the summer varies from 45° F in April to 70° F in July.

Westerly winds prevail in the winter but are affected by topography. The average velocity is 10 miles per hour and increases to 25-30 miles per hour during the spring windy season.

#### LAND STATUS

The Ignacio Chavez Wilderness Study Area consists of 9,961 acres of public land with no inholdings.

#### ACCESS

The Ignacio Chavez WSA can be reached by proceeding southwest off State Highway 44 onto state-maintained gravel roads that extend to the north, east, and west of the WSA.



## SECTION 2

## EXISTING RESOURCES

## GEOLOGY

Structurally, the Ignacio Chavez WSA is relatively simple. There are few faults and only gentle folding (associated with the termination of McCarty's Syncline). The sedimentary rocks of the WSA dip at a low angle to the northwest into the San Juan Basin. The WSA is situated on the southeastern margin of the basin, approximately on the boundary between the Chaco Slope and the Central Basin. In this region of relatively slight deformation and gentle dips, volcanic and sedimentary rocks crop out in many small cliffs and several spectacular escarpments (refer to Figure 1).

## ENERGY AND MINERALS

Although some of the Ignacio Chavez WSA is dominated by basalt flows (capping the top of the Cebolleta Plateau), a large part of the WSA's geology is characterized by a thick sequence of sedimentary rock outcrops. This sedimentary sequence contains rock that ranges in age from Pennsylvanian to Cretaceous and is known regionally to contain deposits of oil and gas, coal, uranium, copper, silver, limestone, gypsum, humate and clay. Table C-1 is a list of the stratigraphic formations and minerals that occur in the sub-surface beneath the Ignacio Chavez WSA.

## PALEONTOLOGY

While the igneous rocks in the Ignacio Chavez WSA are non-fossiliferous, the exposed sedimentary rocks are known regionally to contain a varied fossil assemblage. The Point Lookout Sandstone contains trace fossils and plant fragments, while the Menefee Formation also contains plant fragments and vertebrate material. The Mancos Shale represents deposition under fully marine conditions, and its fauna is dominated by molluscs.

## WATER

Surface Water

The WSA lies in a tributary watershed of the Rio Puerco, which ultimately flows into the Rio Grande. It is considered a part of the Middle Rio Grande Major River Sub-Basin.

Arroyos in the WSA are ephemeral. Runoff occurs at many times throughout the year, but volume varies by season. Peaks commonly occur during the afternoon thundershower season from July through September, when tremendous runoff volumes are generated. Comparison of rainfall data with discharge data for this season shows that up to 99 percent of the annual recorded discharge may occur during this three-month period (Craig 1980).

Figure 1

# Stratigraphic Section, Cabezon, Empedrado, Ignacio Chavez, La Lena, and Ojito Wilderness Study Areas

ERA	SYSTEM OR PERIOD	GROUP	FORMATION OR MEMBER	LITHOLOGY
CENOZOIC	QUATERNARY		PEDIMENT	
	TERTIARY		SANTA FE	
	CRETACEOUS	MESAVERDE	PICTURED CLIFFS	
			LEWIS	
			CLIFF HOUSE	
			MENEFEE	
			POINT LOOKOUT	
			CREVASSE CANYON	
			GALLUP	
			MANCOS	
			DAKOTA	
			BRUSHY BASIN	
	JURASSIC	SAN RAFAEL	WESTWATER CANYON	
			RECAPTURE	
			BLUFF	
			SUMMERVILLE	
			TODILTO	
MESOZOIC	TRIASSIC	CHINLE FORMATION	ENTRADA	
			UNNAMED SILTSTONE	
			PETRIFIED FOREST	
			POLEO SANDSTONE LENTIL	
			SALITRAL SHALE TONGUE	
	PERMIAN	MAGDA-LENA	AGUA ZARCA	
			SAN ANDRES	
			GLORIETA	
			YESO	
			ABO	
PALEOZOIC	PENNSYLVANIAN		MADERA	
	MISSISSIPPIAN		SANDIA	
	PRECAMBRIAN		ARROYO PENASCO	
CAMBRIAN			PRECAMBRIAN	



Table C-1

## MINERAL RESOURCE ASSESSMENT FOR THE IGNACIO CHAVEZ WSA

Mineral Commodity	Geologic Unit	Development Potential
<u>Locatables</u>		
Uranium and thorium	Abo Formation	---
	Morrison Formation	3-B
	Dakota Formation	---
	Point Lookout Formation	---
Metals (copper, silver molybdenum and gold)	Agua Zarca Member	2-B
	Abo Formation	2-B
	Madera Formation	2-B
Non-metallics (gypsum)	Todilto Formation	3-A
<u>Leasables</u>		
Oil and gas	Sandia Formation	3-C
	Entrada Formation	3-C
	Dakota Formation	3-C
	Mancos Formation	3-C
	Mesaverde Group	3-C
Geothermal	No specific geologic unit	2-B
Sodium and potassium	No specific geologic unit	2-A
Coal	Mesaverde Group	4-C
Bituminous rock	No specific geologic unit	2-C
<u>Salables</u>		
Sand and gravel	No specific geologic unit	3-C
Clay (common varieties)	No specific geologic unit	3-A
Humates	Mesaverde Group	4-C
Petrified wood	Mesaverde Group	2-A
Cinders	No specific geologic unit	3-C

A - Insufficient Data; B - Indirect Evidence; C - Direct Evidence  
D - Abundant Direct and Indirect Evidence

- 1 - The geologic environment and the inferred geologic processes do not indicate favorability for accumulation of mineral resources.
- 2 - The geologic environment and the inferred geologic processes indicate low favorability for accumulation of mineral resources.
- 3 - The geologic environment, the inferred geologic processes, and the reported mineral occurrences indicate moderate favorability for accumulation of mineral resources.
- 4 - The geologic environment, the inferred geologic processes, the reported mineral occurrences, and the known mines or deposits indicate high favorability for accumulation of mineral resources.

Adapted for GEM Study and Turner, BLM, 1982.

Average annual water yields from the WSA fall between 0.1 and 0.5 inches (.25 inches average, or 2,645 acre-feet per year). Water yield from El Banquito Mesa ranges from 1 to 3 inches annually.

### Ground Water

The WSA lies within the Rio Grande State-declared underground water basin. One developed spring (for livestock use) and two undeveloped springs exist in the WSA.

Ground water is usually not available at a reasonable depth except in the alluvium. The quality of this ground water ranges from fresh to moderately saline, but is usually marginal for domestic uses. Yields are usually very low (Craig 1980).

### SOILS

Soils in the Ignacio Chavez WSA occur in three general categories: those developing on basalt at the higher, mesa-top elevations under pinyon and ponderosa pine; soils on the steep, stony sideslopes; and those developing on sandstones and shales at the lower elevations (refer to Table C-2).

Soil erosion and limitations on vegetation productivity are generally greatest on soils in the third category. Soils in the second category are generally stable due to the high content of stones and boulders, and these soils have good vegetation production potential. The soils on the mesa tops of the Ignacio Chavez WSA have the most potential for high productivity because of favorable texture, depth, and precipitation.

### VEGETATION

Table C-3 summarizes the vegetation of the Ignacio Chavez WSA grouped according to range sites. Map C-3 displays the range sites and the present vegetation species (listed in Table C-3). On Range Site 5, which occupies a majority of the WSA (5,132 acres--Map C-3), blue grama, juniper, and galleta grass are the predominant species.

### WILDLIFE

The Ignacio Chavez WSA is within one of the most diverse and productive wildlife habitat areas on BLM-administered lands in northwest New Mexico. Approximately 257 vertebrate species may inhabit the WSA, including 146 species of birds, 71 of mammals, 31 of reptiles, and 9 species of amphibians. (A complete list of these animals is located in Run Wild, the USDA Forest Service 1982 computer printout on file in the Rio Puerco Resource Area.)

The interspersed of pinyon-juniper woodland, ponderosa pine with oak understory, and open grassland parks on the Ignacio Chavez WSA, along with the protection afforded by the steep slopes and cliffs of Mesa Chivato, provide potentially excellent habitat for many species of wildlife. These species include at least six game species (mule deer, elk, Merriam's turkey, black bear, tassel-eared squirrel, and mourning dove). Other wildlife common to the



TABLE C-2

## SOILS

Unit <sup>a/</sup>	Soil Type	Percent Slope	Acres
Ak	Alkali Alluvial Land	0-5	643
Bc	Basalt Outcrop-Orthents-Ustolls Complex	3-30	6,709
Bf	Berent-Sandstone Outcrop Complex	1-25	56
Fs	Fruitland-Slickspots Association	0-5	121
Km	Kim Loam	3-8	529
Lt	Litle-Las Lucas-Persayo Association	1-25	144
Lu	Shingle Complex	3-25	19
Pf	Penistaja Fine Sandy Loam	0-5	96
Ph	Penistaja-Hagerman Association	2-5	63
Rt	Travessilla-Shingle-Rock Outcrop Complex	3-30	804
To	Torreón Loam	0-3	777

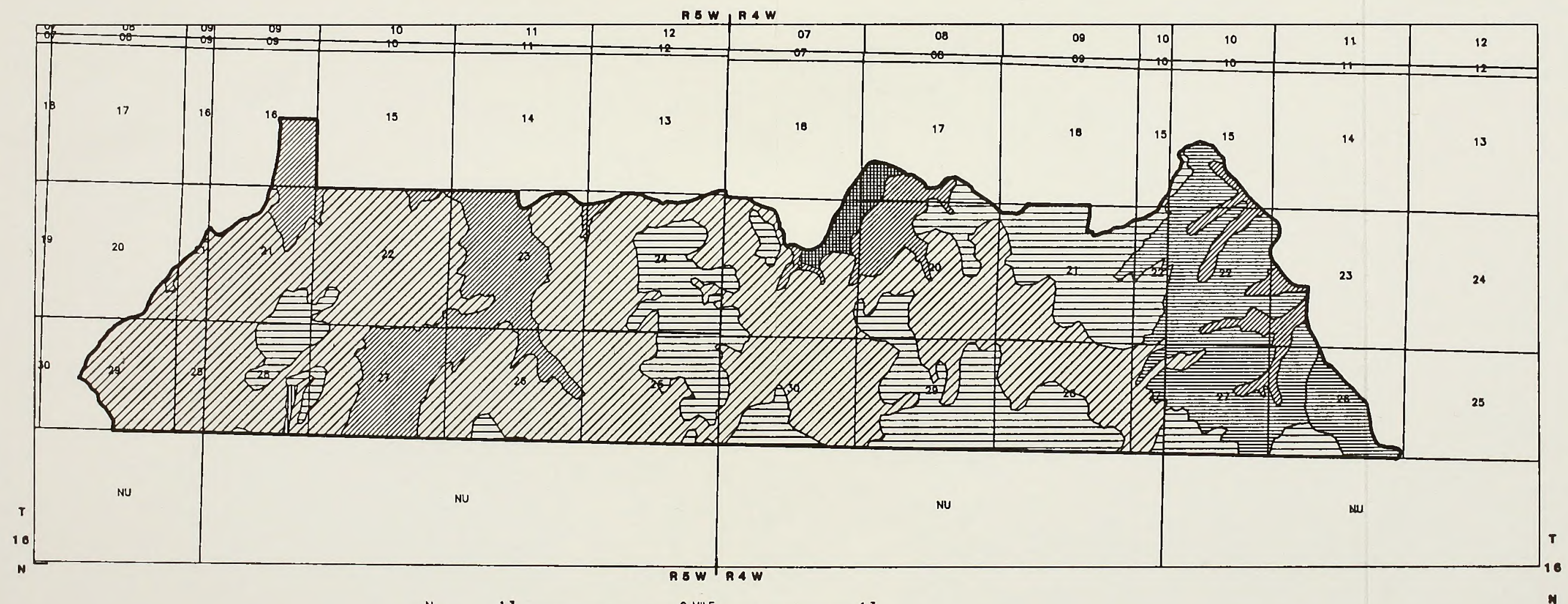
Note: <sup>a/</sup> Units correlate to the soils map on file in the Rio Puerco Resource Area.

TABLE C-3  
VEGETATION, IGNACIO CHAVEZ WSA

Range Site Number	Ecotype	Slope Percent	Aspect	Vegetative Cover (Percent)	Carrying Capacity Acres/AUM	Range Condition	Present Vegetation Species	Potential Perennial Plant Density (%)	Production (lbs/ac)	Potential Vegetation Species	Related Soil Type
1	Pine-Douglas fir	1	North, nearly flat	36	4.6	Good	Blue grama, galleta grass, broom snakeweed	25	1,100	Mt. muhly, Ariz. fescue, needle and thread grass	150-un-named 5 loam
2	Pine-Douglas fir	7	N, E, nearly flat	47	12.13	Good	Pinyon, Gambel oak, ponderosa pine	28	1,113	Ariz. fescue, Mt. muhly, prairie Junegrass, ponderosa pine	101-Cabazon-Basalt Outcrop Association
3	Pine-Douglas fir	26	N and E aspect	38	13.87	Fair-good	Ponderosa pine, Gambel oak, mutton blue-grass	25	850	Ariz. fescue, Mt. muhly, NM muhly, mutton blue-grass	101-Cabazon-Basalt Outcrop Association
4	Juniper-pinyon	24	N and E aspect	28	10.96	Poor-good	one-seed juniper, galleta grass, blue grama	15	450	Alkali sacaton, blue grama, Indian rice-grass, one-seed juniper	100-Basalt Outcrop-Orthents-Ustolls Complex
5	Juniper-pinyon	18	N and W aspect	43	5.58	Fair-good	Blue grama, one-seed juniper, galleta grass	20	450	Blue grama, black grama, NM feather-grass, bottlebrush squirreltail	100-Basalt Outcrop Orthents-Ustolls Complex
6	Grana-galleta steppe	4	All aspects	18	6.39	Poor-good	Alkali sacaton, galleta grass, blue grama	45	2,500	Vine mesquite, alkali sacaton, blue grama, four-wing salt-bush	170-Kim Loam
7	Grana-galleta steppe	2	S and W	25	23.3	Fair	Alkali sacaton, galleta grass, broom snakeweed	10	225-475	Alkali sacaton, sideoats grama, Indian rice-grass, Bigelow sage	011-Travesilla-Shingle Proded Rock Outcrop Complex
8	Grana-galleta steppe	3	N	24	8.57	Fair	Galleta grass, blue grama, broom snakeweed	20	650	Western wheatgrass, bottlebrush squirreltail, Indian ricegrass, galleta	Penistaja Fine Sandy Loam
9	Grana-galleta steppe	5	N	22	11.20	Fair	Broom snakeweed, galleta grass, alkali sacaton	20	450	Indian rice-grass, bottlebrush squirreltail, blue grama, four-wing salt-bush	141-Penistaja Bond Association



# VEGETATION, IGNACIO CHAVEZ WSA



BUREAU of LAND MANAGEMENT

SECTIONS	
NM-010-020	
RANGE SITE 1 - 12 ACRES	
RANGE SITE 4 - 2235 ACRES	
RANGE SITE 5 - 5132 ACRES	
RANGE SITE 6 - 1335 ACRES	
RANGE SITE 8 - 1142 ACRES	
RANGE SITE 9 - 105 ACRES	
TYPE LINES	

MAP C-3







area include coyotes, badgers, porcupines, cottontails, Gunnison's prairie dog, golden eagles, sharpshinned hawks, red-tailed hawks, Stellar's jays, pinyon jays, and gray-headed juncos.

### Threatened and Endangered Species

The bald eagle and the peregrine falcon are the only threatened/endangered species likely to occur in the WSA, although no reported sightings have been made.

### VISUAL RESOURCES

Based on landform, coloration, water, vegetation, lack of intrusions, and uniqueness, the Ignacio Chavez WSA has been rated as having a Class A scenery, or a high scenic quality (USDI, BLM Upper Rio Puerco Unit Resource Analysis, 1971). In a visual resource study done for the Proposed Rio Puerco Livestock Grazing Management Program ES (USDI, BLM 1978), the area in which the WSA is located was categorized as a VRM Class II (refer to Enclosure 1 of this appendix for description of VRM Class II). Using these two studies, the Ignacio Chavez WSA ranks as having a high overall value for its visual resources.

The mesas and their escarpments, along with the diversity of vegetation, contribute to this high scenic value within the WSA. From El Banquito Mesa in the WSA, expansive scenic vistas into the Cabezon WSA, the Empedrado WSA, the La Lena WSA, and the Nacimiento Mountain Range are provided.

### CULTURAL RESOURCES

Although the cultural resource inventory within this WSA has been very limited, it suggests that at elevations exceeding 7,000 feet, little probability exists of encountering sites with architectural features.

While early man did not habitually live in this region at these altitudes, he probably crossed them while traveling, hunting game, and obtaining vegetable foods and materials. Two sites are recorded within the boundaries of this WSA. One is historic but of unknown date, and the other has no defined cultural or temporal affiliation.

Although no known Archaic sites exist within the WSA, Archaic populations have made extensive use of the middle Rio Puerco Valley. It is reasonable to assume these people made some use of the resources within the WSA.

No specific site location predictions can be made for Navajo sites within the WSA, but ethnographic information on similar environmental settings (Black Mesa and Navajo Mountain) suggests that high mesa meadows have been preferred summer grazing locations.

### AIR QUALITY

Ambient air quality monitoring data for the general area of the Ignacio Chavez WSA was collected during 1975-76 by the State of New Mexico

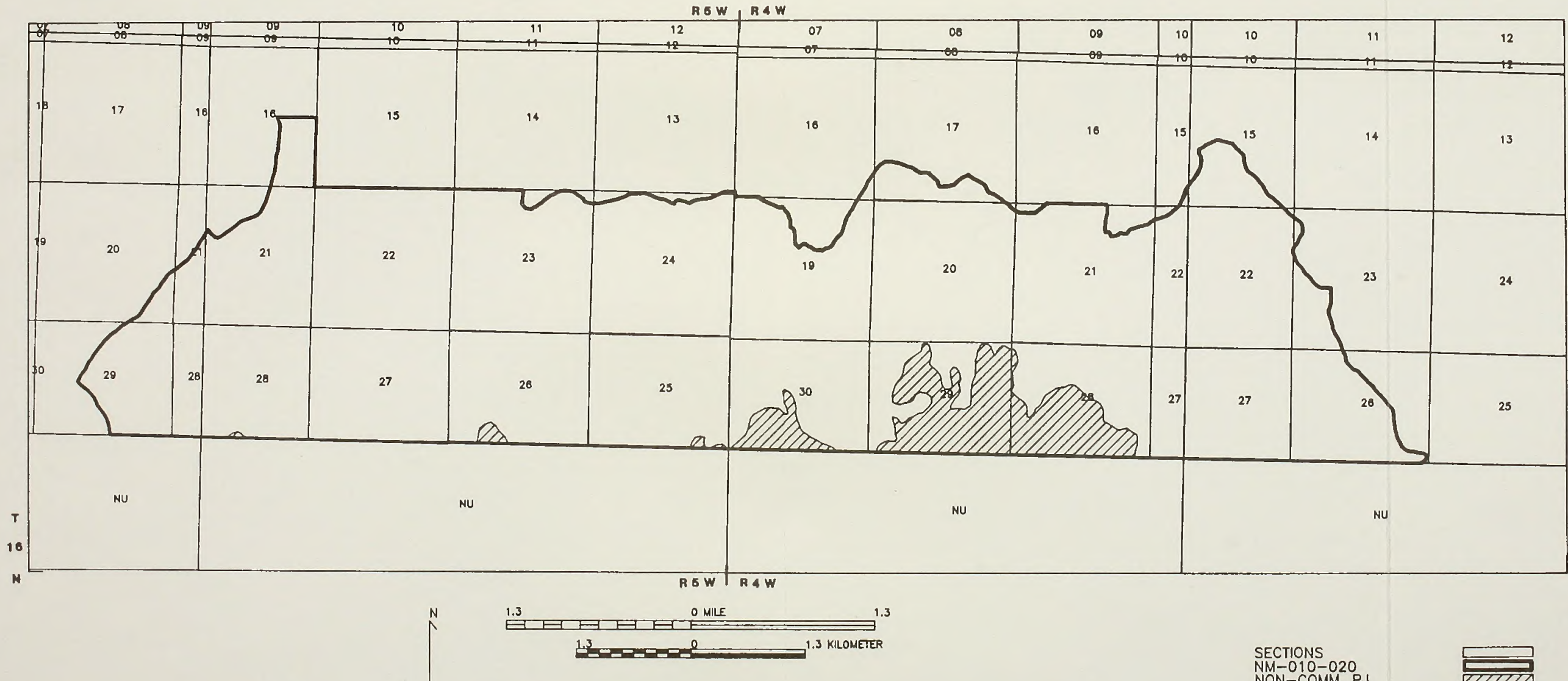
Environmental Improvement Agency, Air Quality Division. Readings were all within the Class II standards established by the Clean Air Act (as amended, 1977) for BLM-administered lands.

#### FOREST PRODUCTS

Pinyon-juniper woodlands in the Ignacio Chavez WSA could provide a marginal source of posts and fuelwood, though no forest products are under contract or permit use (refer to Map C-4). Juniper occupies the lower elevation sites near the sagebrush zone, but the trees are mostly scrubby and of little importance as a forest product. Pinyons occupy elevations between 5,200 and 8,200 feet. Larger junipers exist with the pinyons at these higher elevations, and could yield fenceposts or poles.



## FOREST TYPES, IGNACIO CHAVEZ WSA



BUREAU of LAND MANAGEMENT

**MAP C-4**





## SECTION 3

## EXISTING AND POTENTIAL USES

## MINERAL DEVELOPMENT

Within the Ignacio Chavez WSA, those public lands north of the Ignacio Chavez Land Grant boundary are underlain by BLM-administered minerals. Only minor exploration and development has occurred on the WSA. As of August 1982, 269 mining claims were recorded and 10 oil and gas leases issued on public lands within the WSA boundaries. No mining has occurred, and the level of mining exploration activity has been low.

Table C-1 (Section 2) is a list of those minerals that are known or suspected to occur beneath the WSA. The highest potential for development is associated with coal and humates, which occur in the Mesaverde Group. The geologic environment, inferred geologic processes, reported mineral occurrences, and known mines and deposits indicate a high favorability for the presence of these mineral resources. A successful exploration program could lead to the development of a small surface or underground coal mine. All of the other listed minerals have only a low to moderate potential for development.

## WATERSHED

The cyclic erosion that has occurred on the Ignacio Chavez WSA for several million years has had a major effect on the ecosystem. The effects of the most recent period of erosion on the lands in the region of the WSA were observed by explorers in the mid-nineteenth century. A major change in the natural vegetation of the rangelands in the WSA has occurred during the past 100 years, adversely affecting agricultural economics. Overgrazing of natural vegetation has increased erosive runoff; this, coupled with a climatic drought, was responsible for arroyos cutting into the WSA (Elliot 1979).

## LIVESTOCK GRAZING

The Ignacio Chavez WSA includes parts of three grazing allotments (refer to Map C-5); WSA allotment acreage supports 985 Animal Unit Months. Table C-4 displays current grazing information pertaining to these three allotments.

Most of the operators grazing livestock in the WSA ranch as a second income or to continue family tradition; ranching is not their primary source of income. They live in the vicinity of Cuba and Albuquerque, near their primary sources of income. Therefore, they can attend to their grazing allotments only on weekends, and the pickup truck has become increasingly important as a livestock management tool.

TABLE C-4  
RANGE ALLOTMENT INFORMATION

Allotment Name	Number	Total Acres	WSA Acres	Number of Permittees	Authorized Livestock Use	Season of Use
Ignacio Chavez Grant	0050	27,076	418	4	200 head	yearlong
Chico Crossing	0043	15,339	5,306	2	170 head	yearlong
Azabache	0042	21,188	4,237	2	269 head	175 head yearlong and 94 head for 8 months

Ignacio Chavez Grant Allotment (#0050)

This allotment has a BLM Allotment Management Plan (AMP) that is not fully implemented. No range improvements are planned for construction in the WSA. Upon implementation of the AMP, the Guadalupe Allotment (with one permittee) will be combined with the Ignacio Chavez Grant Allotment. This allotment combination was proposed to facilitate a rest-rotation grazing system on these two allotments. The combination would increase the number of livestock that graze this WSA from 150 to 200 head. However, the length of time that the WSA would be grazed would be decreased, and the grazing system would allow critical growing season rest for one pasture each summer.

Chico Crossing Allotment (#0043)

Two spring developments are proposed for construction in this allotment.

Azabache Allotment (#0042)

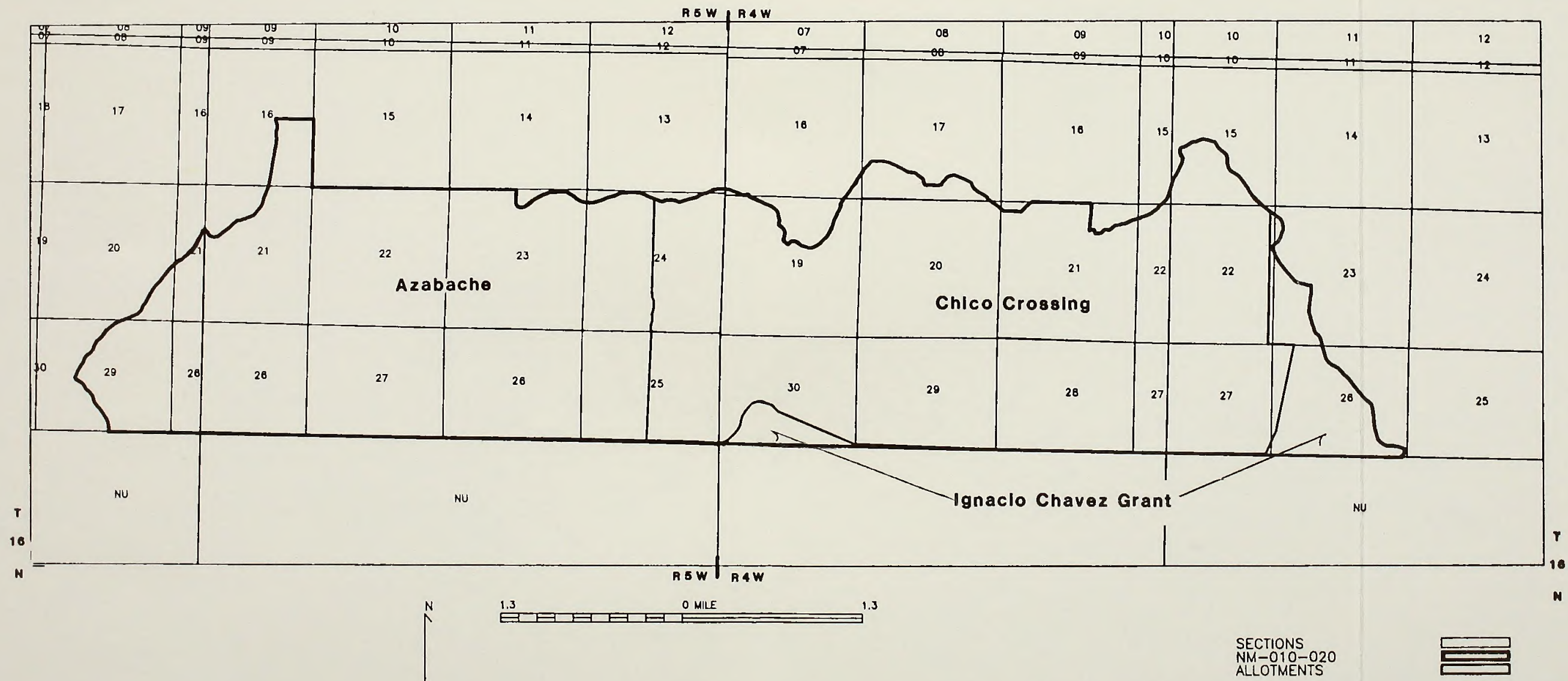
Of the four pastures proposed in the AMP, two pastures would contain WSA acreage. No improvements are proposed.

FOREST PRODUCTS

Local residents have historically used the pinyon-juniper type in the region for a source of home use fuelwood. Other products taken from this type are pinyon nuts, seedlings, Christmas trees, and posts.



## RANGE ALLOTMENTS, IGNACIO CHAVEZ WSA



BUREAU of LAND MANAGEMENT

**MAP C-5**





No estimate can be made on the number of cords of fuelwood that could be harvested, but the yield would be marginal compared to the stands on the Ignacio Chavez Land Grant. Neither can an estimate be made on the number of pounds of pinyon nuts the WSA could yield. Local people seldom apply for a permit for nut collection or cutting of Christmas trees, but neither item is a major product of the WSA.

## RECREATION

The Proposed Rio Puerco Livestock Grazing Management Program Environmental Statement (1978) divided the WSA into three Recreation Information System (RIS) units. Each unit was given a quality rating for a number of activities according to key quality factors, as shown in Table C-5.

TABLE C-5

### RECREATION QUALITY EVALUATION

Activity	Ignacio Chavez West Unit	Ignacio Chavez East Unit	Chico Arroyo Unit	Key Factors
ORV use	low	low	high	Soil, size, hazards, usability
Sightseeing (scenery)	high	high	medium	Landform, color, water, vegetation, uniqueness, intrusions
Sightseeing (geological)	medium	medium	-	Extent, representative type, form, color, frequency of occurrence
Big Game Hunting	medium	medium	-	Game population, ease of movement, shooting opportunity
Primitive Values	high	high	high	Scenic qualities, size, intrusions, wildlife, fisheries, water usability, uniqueness

The RIS is used to describe the existing recreation environment. It indicates that the WSA contains high primitive and sightseeing values and that the diverse range of terrain, vegetation, and environmental transition zones greatly enhance recreation opportunities within the WSA. As presently proposed, the Continental Divide National Scenic Trail would cross the eastern third of the WSA.

The WSA lies within New Mexico State Planning District 3. Recreation demand in this district is indicated in a study completed by the University of New Mexico's Bureau of Business and Economic Research (1975). The figures for regional recreation demand (Table C-6) indicate the types of activities that the WSA may be required to support.

#### EDUCATION/RESEARCH

The variety of ecosystems located within Ignacio Chavez provide an exceptional opportunity to utilize a "natural laboratory" where natural systems can be observed. This diversity includes rolling grasslands, foothills, steep mesa slopes, canyons, and mesa tops. Each type supports its own characteristic vegetation and wildlife. How these different zones blend and complement one another's survival is as important to education/research goals as is the study of each zone singularly.

#### NATIVE AMERICAN USES

Native Americans (particularly the nearby Navajo, Jemez, Zia and Santa Ana peoples) have traditionally used the area of the Ignacio Chavez WSA for firewood gathering and hunting. Some use continues presently.

Cerro Parido and Azabache Mesa are traditional snake- and eagle-catching areas. El Banquito Mesa is actively used by members of the Zia Pueblo for prairie dog hunting, and is also a prime area for projectile point and fetish collecting.

Recent survey and interviews with officials of the Santa Ana, Laguna and Acoma Pueblos and the Canyoncito Navajo Reservation show that many places of religious significance exist in and near this WSA. Specific site locations are not known to the lay members of these tribes because only tribal elders know of and watch over such sites. Apparently it would be indiscreet for the secular governments to propose a survey or to provide any information of such an esoteric nature. Traditional uses within the boundaries of this WSA by Native American populations are expected to continue.

#### WILDLIFE

The WSA is within the boundaries of the area covered by the Upper Rio Puerco Habitat Management Plan, a cooperative effort between the BLM and the New Mexico Department of Game and Fish. The following wildlife and habitat problems on the Ignacio Chavez WSA have been identified in the plan (USDI, BLM and NMDGF 1974; USDI, BLM 1981):

1. Low browse density and poor browse condition exist due to past heavy use by livestock and wildlife.



TABLE C-6

REGIONAL RECREATION DEMAND  
(based on visitor use days)

Activity	1975	1980	1985	1990
Pleasure walking	7,487,332	8,448,000	9,209,000	10,002,000
Jogging	4,256,140	4,802,000	5,235,000	5,686,000
Park visits	1,945,664	2,190,000	2,388,000	2,593,000
Birdwatching	1,394,103	1,573,000	1,714,000	1,862,000
Horseback riding	1,249,915	1,410,000	1,538,000	1,669,000
Photography/Painting	1,051,006	1,186,000	1,293,000	1,404,000
Sightseeing	925,059	1,043,000	1,138,000	1,236,000
Picnicking	786,083	887,000	967,000	1,050,000
Hiking	427,351	482,000	526,000	571,000
Rock hounding	424,745	479,000	522,000	567,000
Visiting historical sites	422,573	477,000	520,000	564,000
Camping	394,444	445,000	485,000	527,000
Small game hunting	247,551	279,000	304,000	331,000
Rock climbing	138,541	156,000	170,000	185,000
Backpacking	111,180	125,000	137,000	148,000
Big game hunting	98,151	111,000	121,000	131,000
Cross country skiing	33,875	38,000	42,000	45,000

Source: University of New Mexico, Bureau of Business and Economic Research  
1975.

2. Poor-quality forage species exist in open parks due to past livestock abuse.
3. Water distribution is poor.

BLM proposals for mitigating these problems include:

1. Prescribed burning to reduce pinyon-juniper invasion and forest litter, and to stimulate expansion of browse, cool-season grasses, ponderosa pine, and (in some cases) aspen.
2. Development and maintenance of one spring on the slope of Mesa Chivato.
3. Development of a game-bird enclosure.

The WSA provides about 1,500 hunter days, primarily for big game hunting, but also including some game bird and varmint hunting. Average deer hunter success is about 10 percent each year in the Mount Taylor Management Unit of which the WSA is a part (NMDGF 1981).



## SECTION 4

## WILDERNESS CRITERIA

## EVALUATION OF WILDERNESS VALUES

Quality of Mandatory Wilderness Characteristics

## Naturalness

A detailed description of the imprints of man's work is documented in the wilderness intensive inventory (USDI, BLM 1980). In summary, man-made intrusions include a fenceline network, 6 earthen dams, 3 drill pads, and 10 two-track vehicular routes. The BLM considers the overall effects of these imprints upon the entire WSA when assessing naturalness. This is a function of the size of the unit and the number and distribution of the impacts. Tremendous variation in terrain, environmental transitional zones, and vegetation provide the user with a wide variety of opportunities to experience a high-quality, primitive and undeveloped type of recreation. Overall, the Ignacio Chavez WSA generally appears natural. This quality is somewhat diminished in the eastern part of the WSA because of the presence of large earthen dams.

## Opportunities for Solitude

The BLM regards solitude as the state of being alone or removed from habitations, isolation. The mesas, large canyons, volcanic plugs, spectacular escarpments, and numerous arroyos, washes, and smaller canyons of the Ignacio Chavez WSA provide expansive topographic diversity (refer to Figures 2, 3, and 4). This large diversity prevents one particular attraction from drawing large numbers of visitors; this in turn supports dispersed use and enhances solitude. The Ignacio Chavez WSA also displays generous vegetative screening. Overall, this WSA possesses outstanding opportunities for a user to experience solitude.

## Opportunities for Primitive and Unconfined Recreation

The BLM considers primitive and unconfined recreation as the potential a WSA has to provide opportunities for a diversity of possible activities, or one activity of outstanding quality. The Ignacio Chavez WSA contains abundant opportunities for a variety of quality primitive recreation experiences.

Backpacking, hiking, and camping opportunities within the WSA are considered excellent. Sightseeing opportunities are plentiful anywhere along the rims of Chivato, Cortada, La Azabache, and El Banquito mesas. Sightseeing related to historical, geological, botanical, archeological, and geological values, big and small game hunting, horseback riding, birdwatching, and photography exist throughout the WSA. Tremendous variation in terrain, environmental transitional zones, and vegetation provide the user with a wide variety of opportunities to experience a high-quality, primitive and undeveloped type of recreation.



Figure 2 - View of the landforms in the eastern part of the Ignacio Chavez WSA.



Figure 3 - The southern portion of the Ignacio Chavez WSA looking east towards Cabezón Peak. The formation on extreme right of photo is known as "Bear's Mouth".





Figure 4 - Majestic views of Cabezón Peak such as this one are provided from four WSAs: the Ojito, the La Lena, the Empedrado, and the Ignacio Chavez. El Cabezón is the most prominent and best-known of the numerous volcanic plugs in the Rio Puerco Valley.



Figure 5 - Wildlife habitat provided on the Ignacio Chavez WSA.



## Special Features

Visual appeal and the diversity of land forms and vegetation are perhaps the most outstanding special features of the Ignacio Chavez WSA. The rising green slopes and mesa tops contrast sharply with the arid desert lands to the north, east, and west.

Special wildlife features include a prairie dog colony, which provides an excellent opportunity for wildlife observers and sightseers to watch these interesting creatures. In addition, prairie dog towns are known for their importance as habitat for other wildlife such as burrowing owls and cottontails. (Prairie dogs are also important natural "tillers". By bringing new soil to the surface, they increase the water-holding capacity of the soil and retard erosion.)

A flock of Merriam's turkeys and migrating herds of mule deer and elk also utilize the WSA (refer to Figure 5). The faunal diversity in the WSA is a function of the integration of several ecotypes to form a varied and productive wildlife habitat. The Ignacio Chavez WSA is within one of the most diverse and productive wildlife habitat areas on BLM-administered lands in northwest New Mexico.

The WSA features sites of Indian, Spanish, and Anglo origin that may contain information needed to help piece together the history of this region.

## Multiple Resource Benefits

As the result of its relatively undisturbed character, the Ignacio Chavez WSA contains a wealth of natural values. Congressional designation as wilderness would carry the weight of law and would provide a greater degree of long-term protection for these natural values than would the administrative designations available to the BLM. A more detailed discussion of multiple resource benefits may be found in Section 6 of this document (All Wilderness Alternative).

## Diversity in the National Wilderness Preservation System

### Ecotypes Present

The Ignacio Chavez WSA according to Robert G. Bailey (USDA, FS 1980) falls under the Dry Domain in the Highland Province and the Colorado Plateau Sub-Province. This sub-province can be further subdivided into the Grama-Galleta Steppe, Juniper-Pinyon Woodland Mosaic, and Pine-Douglas Fir Forest ecotypes (Kuchler 1964). These are described below, from the lowest to the highest in elevation.

Gramma-Galleta Steppe. Total acres in the WSA are approximately 2,582 (26 percent of the WSA).

Juniper-Pinyon Woodland. Total acres in the WSA are approximately 7,367 (74 percent of the WSA).

Pine-Douglas Fir Forest. Total acres in the WSA are approximately 12 (.1 percent of the WSA).



Map C-6 displays these ecotypes. Map C-3 (Vegetation) breaks each ecotype into more refined site categories that are narrated in Table C-3 (Vegetation--located in Section 2 of this document).

#### Distance to Major Population Centers

The Ignacio Chavez WSA is within a day's drive (5 hours) of Bernalillo County and part of Sandoval County, which have been identified in the 1980 census as a Standard Metropolitan Statistical Area (USDC, BC 1981). It is within a 2 1/2-hour drive from the cities of Albuquerque and Santa Fe. (Refer to Map C-2.)

#### MANAGEABILITY

To be recommended as suitable, the Ignacio Chavez WSA must be capable of being effectively managed as wilderness. To determine manageability, the BLM must consider such factors as private inholdings, state lands, valid existing rights, mineral leases, rights-of-way, topography, and the overall land status pattern.

The existing levels of livestock operations, as well as necessary vehicular access and the maintenance of existing range improvements, would continue under wilderness designation. Wilderness designation would not prevent any increase in Animal Unit Months based on Allotment Management Plans.

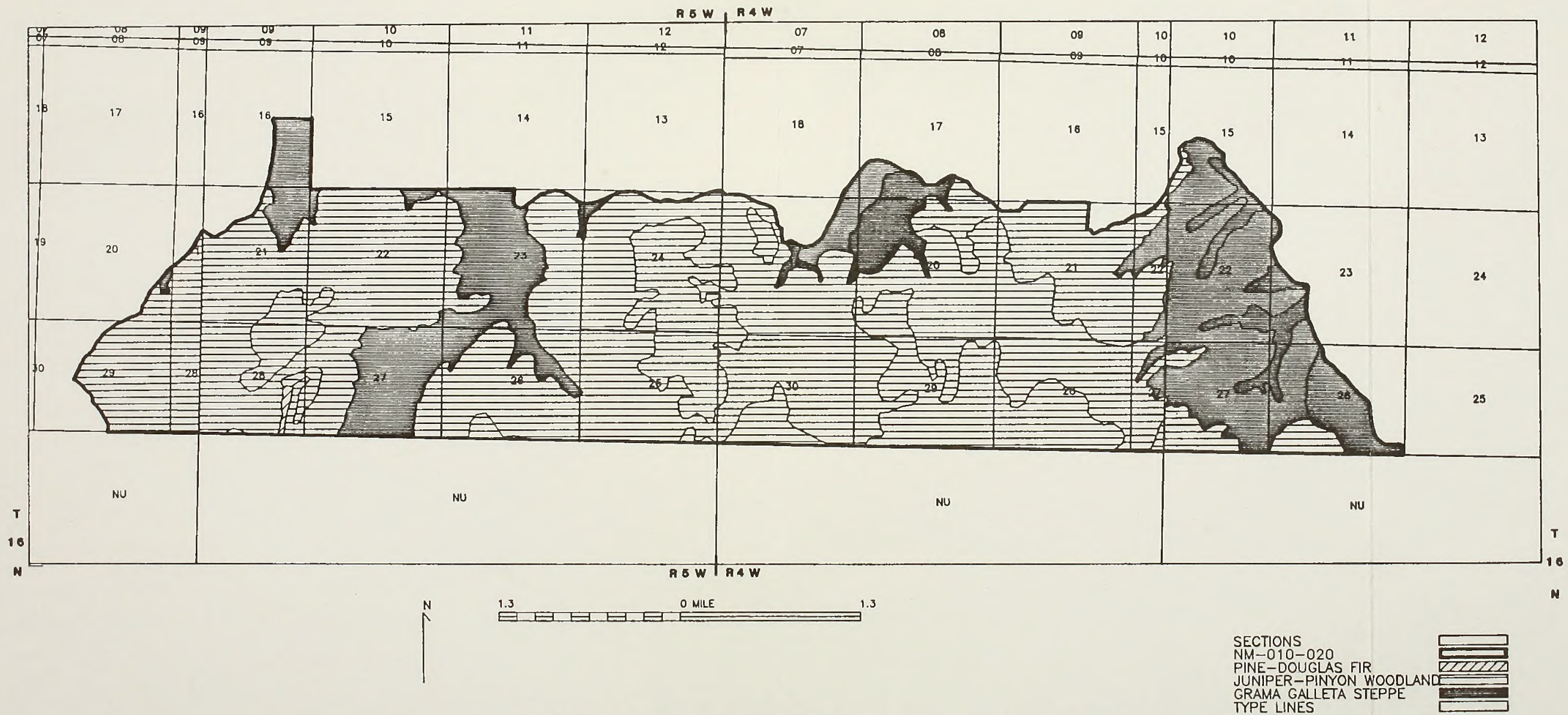
The Ignacio Chavez WSA can be effectively managed for wilderness because of its rugged nature, lack of inholdings, and lack of encumbrance by valid existing rights. The following discussion presents opportunities to enhance the overall management of an already manageable unit.

Two boundary modifications would enhance the manageability of the Ignacio Chavez WSA (refer to Map C-1). Modification 1 (T. 16 N., R. 5 W., Section 16) would drop 90 acres that protrude to the north, and are contiguous on the east with private land and on the north with Indian land. Modification 2 (T. 16 N., R. 4 W., Sections 15, 21, 22, 23, 26 and 27) would delete 1,091 acres that contain large retention dams. These have been reassessed as being significant imprints of man, thus impacting the naturalness of the WSA.





# ECOTYPES, IGNACIO CHAVEZ WSA



BUREAU of LAND MANAGEMENT

MAP C-6







## SECTION 5

### PUBLIC INVOLVEMENT OVERVIEW

A full public involvement effort was made during the wilderness inventory and WSA-designation phases of wilderness analysis. In arriving at a decision on the Ignacio Chavez WSA's wilderness suitability, the BLM is using all public input generated thus far, along with comments received during the remainder of the environmental process.

Proponents of wilderness designation during the earlier public involvement efforts have cited the Ignacio Chavez WSA's wide ecosystem diversity, large size, and apparent natural character. Its close proximity to the cities of Albuquerque and Santa Fe, and thus its ability to serve such a large portion of New Mexico's population, were also pointed out.

Opponents of wilderness designation for the Ignacio Chavez WSA have discussed the effects of excluding the area from possible future mineral exploration and development, the presence of human impacts, possible limitations on ranch operations, and loss of potential fuelwood sites. (Refer to the public response summary for the wilderness intensive inventory, located in Enclosure 3.)

During the public comment period on the New Mexico Wilderness Supplemental Draft Environmental Assessment (USDI, BLM 1983), 113 inputs on the Ignacio Chavez WSA were received from commentators. All but two inputs favored wilderness designation. Supporting reasons included the highly diverse ecosystems, spectacular overlooks, and excellent opportunities for solitude. Several spoke of the benefits to wildlife that could accrue through wilderness designation. Many of the general comments indicated the approximate 33,000-acre original Ignacio Chavez WSA should be examined for wilderness designation, regardless of its "split estate" considerations.

The two inputs opposing wilderness designation cited the Ignacio Chavez WSA's potential for oil and gas, and conflicts with grazing interests as reasons for their opposition.





## SECTION 6

### ALTERNATIVES AND IMPACTS

This section discusses three alternatives for the Ignacio Chavez WSA: All Wilderness, Amended Boundary, and No Action (manage under the existing plan).

#### ALL WILDERNESS ALTERNATIVE

Under this alternative, the entire 9,961 acres of public land within the Ignacio Chavez WSA would be recommended as suitable for wilderness designation. On any acreage designated as wilderness, the existing and potential uses would be regulated in accordance with the BLM's Wilderness Management Policy (1981).

#### Impacts On Wilderness

Wilderness values would be retained and protected over the long term by management under the wilderness management policy. Wilderness designation of the Ignacio Chavez WSA would have both short-term and long-term significant beneficial impacts on the wilderness resources present in the WSA.

#### Impacts On Minerals

Although a moderate favorability exists for the occurrence of uranium, thorium, gypsum, oil, gas, and coal in the Ignacio Chavez WSA, wilderness designation could curtail exploration and prevent possible future extraction.

Under present economic conditions, little demand exists for the extraction of uranium or thorium from the WSA's reserves. At best, with favorable economic conditions, a successful exploration program could lead to the development of a small surface or underground coal mine. The impacts to mineral resources in the WSA under this alternative could be potentially significant over the long-term due to the moderate favorability for occurrence of such minerals as uranium, oil, gas, and coal.

#### Impacts On Other Resources and Uses

This alternative would not have significant impacts on air quality or realty actions in the Ignacio Chavez WSA. For this reason, these subjects are not included in the following discussions.

#### Soils, Watershed and Vegetation

Significant beneficial impacts could occur as the result of restrictions on surface-disturbing and mechanized activities. These restrictions would provide long-term protection for the existing watershed, soils and vegetation.

## Wildlife

Restrictions on surface-disturbing and mechanized activities would provide protection for wildlife habitat. Reduced vehicle access should reduce both legal and illegal furbearer harvest. Restraints on methods of animal damage control could be established. The impacts on wildlife in the Ignacio Chavez WSA would not be significant under this alternative.

## Visual Resources

Existing visual resources would be protected. Under this alternative, the entire WSA would experience VRM Class I management, which would restrict visual modifications to a minimum. No significant impacts would occur.

## Cultural Resources

Site-condition monitoring associated with surveillance could prove beneficial because over 80 percent of the Rio Puerco Resource Area's known sites suffer from significant natural deterioration. It is assumed that enhanced monitoring would take place under wilderness designation. This would increase the ability to detect, and if warranted, to arrest serious deterioration at relatively early stages.

The wilderness management policy allows the natural decay of sites. Excavation and stabilization may be allowed on a case-by-case basis where the State Director determines that the project would not degrade the overall wilderness character and when such activity was needed to preserve the particular cultural resource.

Limited surface-disturbing activities would be allowed under wilderness designation. This could limit the destruction of the Ignacio Chavez WSA's cultural sites through other than natural causes. Overall, wilderness designation would have little impact on cultural resources.

## Livestock Grazing

Livestock operations in the Ignacio Chavez WSA would be impacted by limitations imposed under wilderness designation on the maintenance of existing range improvements and the development of two springs. Although grazing is a permissible and compatible activity under wilderness designation, limitations on vehicular access, type of construction materials, and the location of new improvements may occur in order to protect wilderness values.

An impact to allottees holding permits in the Ignacio Chavez WSA could occur because of limitations on the use of motorized vehicles in designated wilderness areas. Wilderness designation would hinder the effective use of already limited time to tend to weekend ranching operations.

Overall impact to the livestock operators would not be significant and would consist primarily of inconvenience caused by limited vehicular access and restrictions on range development construction.



## Forest Products

The utilization of a small fuelwood source would be precluded. This impact, however, would not be significant.

## Recreation

Opportunities for developed recreation, and recreation activities that require motorized vehicles, including some hunting, would be affected. Opportunities for primitive and unconfined recreation, in high demand regionally, would be preserved. This includes preservation of the natural setting for the Continental Divide National Scenic Trail. Although these opportunities do exist outside of the WSA, the Ignacio Chavez WSA provides the natural setting upon which such outstanding recreation quality is dependent. Impacts to the recreation resource would not be significant under this alternative.

## Education/Research

Wilderness designation would ensure the preservation of the existing "natural laboratory". This would be of significant benefit to the natural setting, and thus to the education/research opportunities in the WSA.

## Native American Uses

Limitations on vehicular access could hinder current Native American uses. However, the preservation of solitude and naturalness could enhance the use of this area for religious purposes, because they are often dependent on a natural setting. However, the impact of this alternative on Native American use of this WSA is unquantifiable.

## AMENDED BOUNDARY ALTERNATIVE

Under the Amended Boundary Alternative, 8,780 acres of public land within the Ignacio Chavez WSA would be recommended for wilderness designation (refer to Map C-1). The amended boundary would exclude 1,181 acres of public land for the reasons of manageability. If the area within the amended boundary is designated wilderness, existing and potential uses would be managed by the BLM's Wilderness Management Policy (1981).

### Impacts on Minerals

Impacts on minerals would be the same as stated in the All Wilderness Alternative, but 1,181 acres could lose their wilderness values under non-wilderness management. This impact would not be significant because these lands are considered to have marginal wilderness values.

### Impacts on Other Resources and Uses

Impacts on other resources and uses would be the same as they would be under the All Wilderness Alternative. The reduced acreage would not significantly impact existing wilderness values. On the 1,181 acres deleted from wilderness consideration, non-wilderness activities would resume.

## NO ACTION ALTERNATIVE

In the Supplemental Draft Environmental Assessment, the Wilderness Analysis Report for this WSA (Appendix A) included three alternatives: All Wilderness, Amended Boundary, and No Action. Since the Draft's publication in August 1983, a comprehensive land use planning effort has been initiated in the Rio Puerco Resource Area. This effort is called a Resource Management Plan (RMP). Tentative alternatives in the RMP currently include possible Special Designation for all or part of this WSA. As a result, the scope of the No Action Alternative for this WSA has changed.

Until Congress makes its decision on wilderness designation, the WSA will be managed under the Final Interim Management Guidelines for Lands Under Wilderness Review (USDI, BLM 1983). If Congress designates it as wilderness, the WSA will be managed under the Wilderness Management Policy (USDI, BLM 1981).

If the area is not designated as wilderness, it will be managed under the No Action Alternative, which would involve management under other than wilderness policy. Management would follow the guidelines of the Rio Puerco RMP.

The RMP is expected to be approved in late 1985 while the wilderness study process is still underway. Therefore, the RMP decision concerning this WSA may be incorporated into the Wilderness Study Report to be written later in this process. The tentative RMP proposal for the Ignacio Chavez WSA currently emphasizes management for the scientific, educational, and interpretive potential of the following values: visual resources, ecotypes, cultural resources, primitive recreation experience, and wildlife.

If the approved RMP does not include special designation for any portion of the Ignacio Chavez WSA, the WSA would be managed under the No Action Alternative according to multiple use concepts without stressing the values listed above. The most probable uses of the area would be continued livestock grazing, possible mineral exploration, fuelwood cutting, and continued ORV use.

Impacts on Wilderness Values

Expected mineral exploration and development, increased ORV activity, continued home-use fuelwood cutting and any other surface-disturbing activities would significantly impact the wilderness resources present in the WSA, and would create a reduction in the opportunities to experience solitude or primitive and unconfined recreation. Over time, all of these uses could be expected to significantly impact naturalness.

Impacts to Other Resources and Uses

The No Action Alternative would not have significant impacts on air quality, realty actions, livestock grazing, minerals, or forestry products. For this reason, these resources are not included in the following discussion.



## Soils, Watershed, Vegetation

Continued vehicular access, potential mineral operations, and other authorized uses could result in reduced watershed quality and allow greater soils and vegetation damage than would occur under wilderness designation. These impacts to soils, water, and vegetation could be significant because a moderate potential for mineral development exists in the WSA.

## Wildlife

Non-wilderness management could result in significant increases in human activity and thus impact those species dependent on an unmodified ecosystem such as mule deer, turkey, bear, and many common small mammals. However, a wider range of habitat management activities could occur under this alternative.

## Cultural Resources

Continued vehicular access would allow the potential for vandalism, but would also provide for more frequent vehicular patrol and monitoring. Cultural resources would be vulnerable to increased surface disturbing activities. These impacts could be mitigated by a wide variety of management options other than wilderness, such as withdrawal or closure as well as specific or area cultural resource management plans. The No Action Alternative would have little impact on cultural resources.

## Recreation

Opportunities for primitive recreation may be reduced, because primitive and unconfined recreation relies on a predominantly natural environment. Such an environment may not exist under non-wilderness management if mineral development occurred throughout the WSA.

The Ignacio Chavez WSA is one of the closest areas to Albuquerque and Santa Fe that currently provides a primitive recreation experience. This WSA has become increasingly popular with the population of these two cities. Several organized group trips by the New Mexico Mountain Club have become annual events. This primitive recreation option may not exist under the No Action Alternative.

Recreation relying on vehicular travel, as well as motocross use, would continue. This opportunity is readily available throughout the majority of the Rio Puerco Resource Area.

Under the No Action Alternative, a significant impact could occur to the WSA's primitive recreation values, if mineral development takes place. ORV use in the WSA would not be significantly impacted.

## Education/Research

The natural setting supporting the special cultural and wildlife features could be significantly impacted by increased surface disturbance and vehicular travel. This would degrade the Ignacio Chavez WSA's potential for use as a "natural laboratory".

### Native American Uses

The natural settings in which Native American uses often occur could be subject to surface-disturbing activities.

### Visual Resources

Existing visual resources could be significantly impacted by landform and vegetation modifications if mineral operations and related facilities are developed.



## ENCLOSURE 1

### CRITERIA FOR VISUAL RESOURCE MANAGEMENT CLASSES

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- Class I - Applies only to classified special areas, e.g., roadless, wilderness, primitive, natural areas, etc. This quality standard is established through legislation or policy. Only natural ecological changes are allowed.
- Class II - Landscapes with Class A scenery quality, or Class B scenery quality in the foreground/middleground zone with high visual sensitivity. Changes in any of the basic elements (form, line, color or texture) caused by a management activity should not be evident in the characteristic landscape.
- Class III - Landscapes with Class B scenery quality and high visual sensitivity in the background visual zone, or with Class B scenery quality and medium visual sensitivity in the foreground/middleground visual zone or with Class C scenery of high visual sensitivity in the foreground/middleground zone. Changes in the basic elements (form, line, color, texture) caused by management activity may be evident in the characteristic landscape. However, the changes should remain subordinate to the visual strength of the existing character.
- Class IV - Landscapes with Class B scenery quality and high visual quality sensitivity in the seldom seen visual zone, or with Class B scenery quality and medium or low visual sensitivity in the background or seldom seen zones, or with Class C scenery quality (except with high sensitivity in the foreground/middleground zone). Changes may subordinate the original composition and character but must reflect what could be a natural occurrence within the characteristic landscape.
- Class V - Applies to areas identified in the scenery quality inventory where the quality class has been reduced because of unacceptable intrusions, or to areas that have the potential for enhancement. This classification indicates that change is needed. The class applies to areas where the naturalistic character has been disturbed to a point where rehabilitation is needed to bring it back into character with the surrounding countryside. It should be considered an interim short-term classification until one of the other objectives can be reached through rehabilitation or enhancement. The desired visual quality objectives should be identified.
- 

Source: After BLM Manual 6310 (U. S. Department of the Interior, Bureau of Land Management, 1975).

## ENCLOSURE 2

### VRM CLASS RATINGS

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"The purpose of a Visual Resource Management (VRM) Class is to reduce the visual impacts of developed activities and to manage the quality of the visual environment."

VRM classes are determined by combining the ratings from scenic quality classes, visual sensitivity levels, and distance zones. Scenic quality classes are rated for landform, water, color, vegetation, intrusions and uniqueness. These elements are combined and the area is quantified as one of the following classes:

Class A - Unique, outstanding features

Class B - Outstanding features common to the physiographic region

Class C - Features common to the physiographic region

Sensitivity levels are determined by frequency of travel through an area, use of area, and public knowledge of the area. These elements are rated and assigned a high, medium or low sensitivity level.

Distance zones are placed in three categories: foreground/middleground zone, background zone, seldom seen zone. The foreground/middleground zone is closer to the view and requires more attention and consideration in management decisions because of the great detail that can be seen in the landscape. The background and seldom seen zones are less detailed to the viewer and most impacts blend with the landscape because of the distance viewed from.

Ratings from scenic quality classes, visual sensitivity levels and distance zones are combined to form VRM classes. The VRM class identifies the suggested degrees of human modification that should be allowed in a certain landscape. See Enclosure 1 for definitions of each VRM class.

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## ENCLOSURE 3

## PUBLIC RESPONSE SUMMARY--

IGNACIO CHAVEZ WSA (NM-010-20)

FAVOR <u>Wilderness Study<sup>a/</sup></u>			OPPOSE <u>Wilderness Designation or Wilderness Study Status</u>		
I	S		I	S	
14	14		7	12	
I	S	<u>Supporting Reasons</u>	I	S	<u>Supporting Reasons</u>
1	1	Meets Size Criterion	2	7	Does Not Appear to be Natural
4	4	Meets Naturalness Criterion	4	4	Resources Conflicts
1	1	Other Insignificant Intrusions			
4	4	Offers Opportunities for Solitude			
4	4	Offers Opportunities for Recreation			
2	2	Supplemental Values			
1	1	Manageable as Wilderness			
7	7	No Supporting Reasons Offered			
I	S	<u>FORM LETTERS &amp; PETITIONS</u>	I	S	<u>FORM LETTERS &amp; PETITIONS</u>
2524	2569	Endorsements of Conser- vationist Proposal			
1	615	Petition Endorsing Con- servationalist Proposal			
<u>SEQUENCE NUMBERS</u>			<u>SEQUENCE NUMBERS</u>		
C015	C030	S047	G025		
C016	K017		G011		
K018	L020		Y004		
F014	L033		D030		
B029	H028		D031		
L022	S035		D029		
L003	D010		0001		

Note: <sup>a/</sup> I = inputs (e.g., letters or public testimony); S = signatures (the number of people who signed a letter).





# APPENDIX D

WILDERNESS ANALYSIS REPORT

LA LENA WILDERNESS STUDY AREA

NM-010-063A  
ALBUQUERQUE DISTRICT

RIO PUERCO RESOURCE AREA







## SECTION 1

## GENERAL DESCRIPTION

## LOCATION

The La Lena Wilderness Study Area (WSA; NM-010-063a) contains approximately 10,310 acres of public land, and is located approximately 7 miles north of the village of Guadalupe, New Mexico. It is bordered on the east side by maintained roads and on the south, north, and west by a combination of maintained roads and property boundaries (refer to Maps D-1 and D-2).

The U.S. Geological Survey Topographic map that covers this WSA is Arroyo Empedrado (7.5 minute quadrangle).

## CLIMATE AND TOPOGRAPHY

The La Lena WSA lies at the approximate center of northwestern New Mexico. Physiographically, the WSA is in the Navajo Section of the Colorado Plateau. The Navajo Section is characterized by outcrops of sandstone with lesser amounts of shale that have been subjected to intensive arid-cycle erosion. Landforms in this region include mesas, cuestras, rock terraces, retreating escarpments, canyons, and arroyos. Approximately 400 feet of relief occurs in the La Lena WSA; from a low elevation of 6,100 feet, the terrain reaches 6,500 feet. The major drainages found in the WSA are Arroyo Empedrado and La Canada de La Lena. The overall geomorphology of the WSA is formed by arroyos cutting sandstone-capped mesas.

The La Lena WSA has a semiarid climate. Warm, relatively dry summers and cold, relatively dry winters are characteristic. The average snowfall in the area is about 37 inches and occurs between October and May. Summer precipitation comes as violent thunderstorms of high intensity, short duration, and extremely unpredictable rainfall patterns, with certain localized areas receiving moisture while adjacent ones receive none. Annual precipitation ranges between 5 and 15 inches, with an average of approximately 11 inches. About 40 percent of the precipitation falls in July and August.

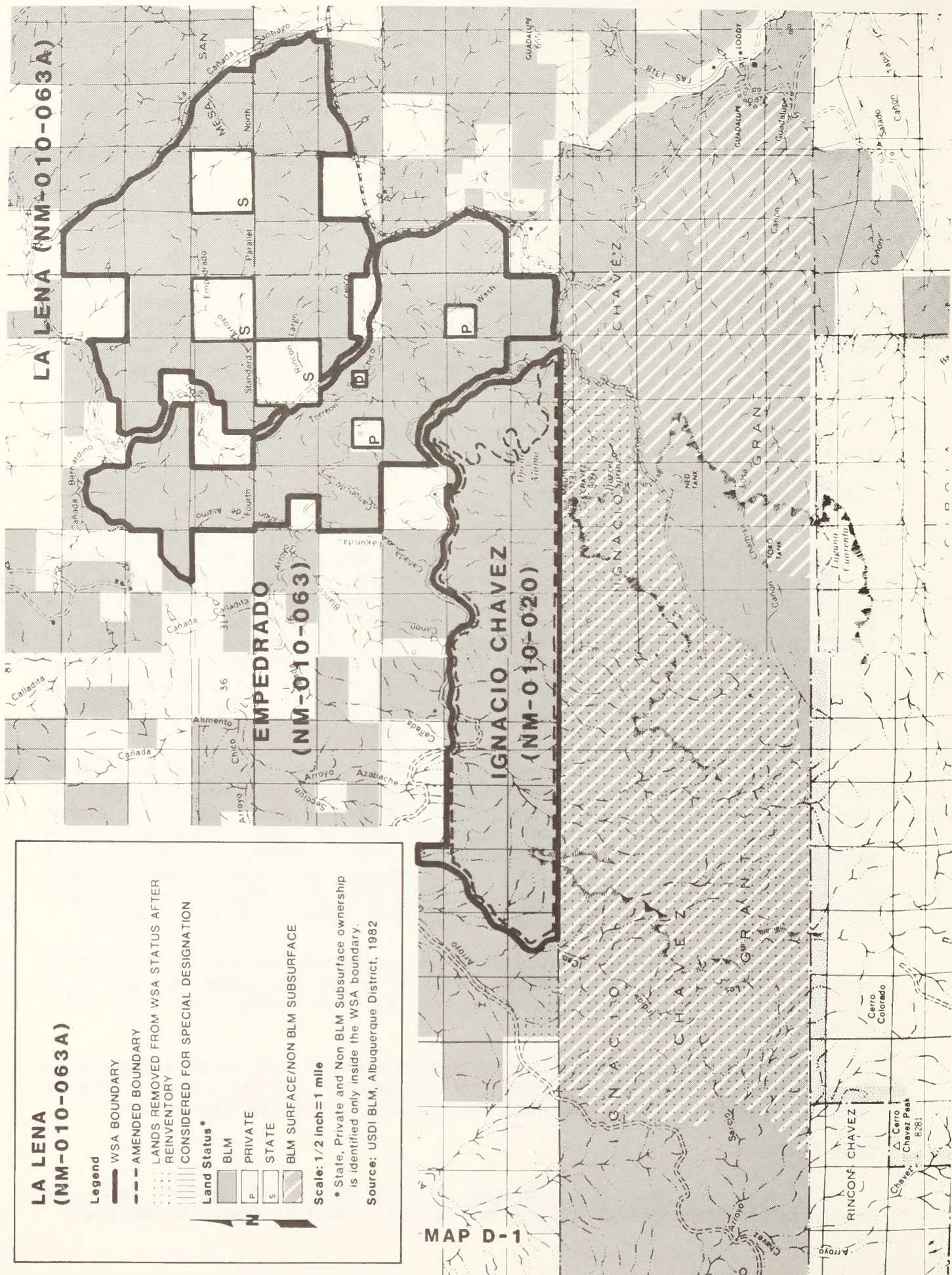
Temperature, like precipitation, is extremely variable from season to season. Extreme temperatures range from 102° F in the summer to -20° F in the winter. Average daily temperatures in the warm months vary from 45° F in April to 70° F in July.

The average growing season is approximately 160 days, beginning in May and ending in October. The full 160-day season is seldom realized because available moisture, rather than the temperature, is the limiting factor.

## LAND STATUS

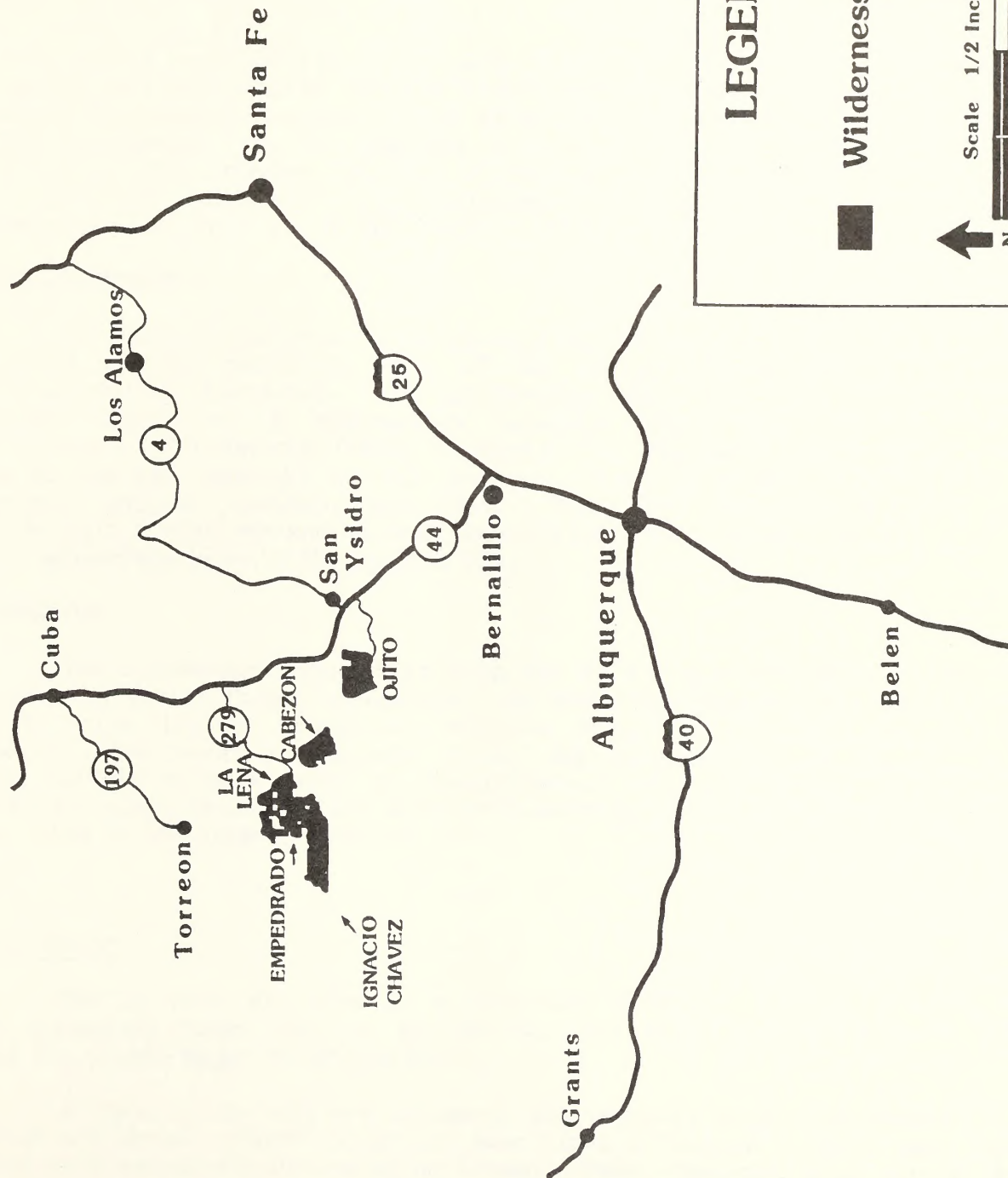
The La Lena WSA contains 10,310 acres of public land and approximately 640 acres of State of New Mexico inholdings (refer to Map D-1).





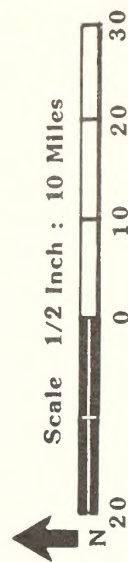


# MAP D - 2 GENERAL LOCATION



## LEGEND

■ Wilderness Study Area



## ACCESS

Access to the La Lena WSA is from State Highway 44. A state-maintained gravel road leads into the WSA from the west, and county-maintained dirt roads constitute parts of the WSA boundary (refer to Maps D-1 and D-2).



## SECTION 2

## EXISTING RESOURCES

## GEOLOGY

The La Lena WSA lies in an area of relatively simple structure, with few faults and only gentle folding (associated with the termination of the McCarty's Syncline). Regional dip is at a low angle to the northwest towards the San Juan Basin. The La Lena WSA is situated on the southwest margin of the basin near the boundary between the Chaco Slope and the Central Basin. In this region of relatively slight deformation and gentle dip, volcanic and sedimentary rocks crop out in many small cliffs and spectacular escarpments.

## ENERGY AND MINERALS

The scenic character found in much of the La Lena WSA is the result of gently dipping sandstone beds of the Menefee Formation that form a cuesta-and-valley landscape. The outcropping Menefee rocks represent the uppermost layers of a sedimentary sequence that ranges in age from Pennsylvanian to Cretaceous (refer to Figure 1). Regionally, this sequence is known to contain deposits of oil and gas, coal, uranium, copper, silver, limestone, gypsum, humates, and clay. Table D-1 is a listing of the stratigraphic formations and mineral commodities that have been shown to occur in the subsurface beneath the La Lena WSA.

## PALEONTOLOGY

The sedimentary rocks that crop out in the WSA are known regionally to contain a varied fossil assemblage. Of the three exposed rock units, the massive Point Lookout Sandstone contains only trace fossils and plant fragments. The remaining exposed units, the Menefee Formation and Mancos Shale, contain a wide range of fossiliferous material. Occurring in the Menefee are plant fragments and vertebrate material, while the Mancos exhibits animal life in the form of molluscs.

## WATER

Surface Water

The La Lena WSA lies in a tributary watershed of the Rio Puerco, which ultimately flows into the Rio Grande. The WSA considered part of the Middle Rio Grande Major River Sub-Basin.

Arroyos in the WSA are ephemeral and commonly deeply entrenched into alluvium and shale. Runoff occurs at many times throughout a given year, but volumes vary enormously depending on season. Peaks commonly occur during the summer and early autumn months, which coincide with the rainy season; up to 99 percent of the annual discharge recorded at the gage may occur during this period (Craig 1980).

Figure 1

**Stratigraphic Section,  
Cabezon, Empedrado, Ignacio Chavez,  
La Lena, and Ojito Wilderness Study Areas**

ERA	SYSTEM OR PERIOD	GROUP	FORMATION OR MEMBER	LITHOLOGY
CENOZOIC	QUATERNARY		PEDIMENT	
	TERTIARY		SANTA FE	
			PICTURED CLIFFS	
	CRETACEOUS	MESAVERDE	LEWIS	
			CLIFF HOUSE	
			MENEFEE	
			POINT LOOKOUT	
			CREVASSE CANYON	
			GALLUP	
			MANCOS	
	JURASSIC	SAN RAFAEL	BRUSHY BASIN	
			WESTWATER CANYON	
			RECAPTURE	
			BLUFF	
			SUMMERVILLE	
			TODILTO	
MESOZOIC	TRIASSIC	CHINLE FORMATION	UNNAMED SILTSTONE	
			PETRIFIED FOREST	
			POLEO SANDSTONE LENTIL	
			SALITRAL SHALE TONGUE	
			AGUA ZARCA	
	PERMIAN	MAGDALENA	SAN ANDRES	
			GLORIETA	
			YESO	
			ABO	
			MADERA	
PALEOZOIC	PENNSYLVANIAN	MAGDALENA	SANDIA	
	MISSISSIPPIAN		ARROYO PENASCO	
	PRECAMBRIAN		PRECAMBRIAN	
CAM-BRIAN	PRECAMBRIAN		PRECAMBRIAN	



TABLE D-1  
MINERAL RESOURCE ASSESSMENT, LA LENA WSA

Mineral Commodity	Geologic Unit	Development Potential
<u>Locatables</u>		
Uranium and thorium	Abo Formation	---
	Morrison Formation	3-B
	Dakota Formation	---
	Mancos Formation	---
Metals (copper, silver molybdenum and gold)	Agua Zarca Member	2-B
	Abo Formation	2-B
	Madera Formation	2-B
Non-Metallics (gypsum)	Todilto Formation	3-A
<u>Leasables</u>		
Oil and gas	Sandia Formation	3-C
	Entrada Formation	3-C
	Dakota Formation	3-C
	Mancos Formation	3-C
	Mesaverde Group	3-C
Geothermal	No specific formation	1-A
Sodium and potassium	No specific formation	2-A
Coal	Mesaverde Group	4-B, N 1/2
		2-B, S 1/2
Bituminous rock	No specific formation	2-C
<u>Salables</u>		
Sand and gravel	No specific formation	2-B
Clay (Common varieties)	No specific formation	3-A
Humates	Mesaverde Group	4-B, N 1/2
		2-B, S 1/2
Petrified wood	Mesaverde Group	2-A
Cinders	No specific formation	2-B

A - Insufficient Data; B - Indirect Evidence; C - Direct Evidence  
D - Abundant Direct and Indirect Evidence

- 1 - The geologic environment and the inferred geologic processes do not indicate favorability for accumulation of mineral resources.
- 2 - The geologic environment and the inferred geologic processes indicate low favorability for accumulation of mineral resources.
- 3 - The geologic environment, the inferred geologic processes, and the reported mineral occurrences indicate moderate favorability for accumulation of mineral resources.
- 4 - The geologic environment, the inferred geologic processes, the reported mineral occurrences, and the known mines or deposits indicate high favorability for accumulation of mineral resources.

Adapted from GEM Study and Turner, BLM, 1982.

## Ground Water

The La Lena WSA lies within the state-declared Rio Grande Underground Water Basin. One known undeveloped spring is located in the WSA.

## SOILS

The soils in the La Lena WSA soils are highly susceptible to erosion, and opportunities for management or conservation are extremely limited. Generally, they have heavier (more clayey) soil textures, saline and/or alkali conditions that inhibit plant growth, and exhibit high susceptibility to water erosion and piping. Numerous gullies that have almost vertical walls are common. The sediment yield from the WSA as a whole is high (refer to Table D-2).

## VEGETATION

Table D-3 summarizes the vegetation found in the La Lena WSA by range site. Map D-3 shows the location of these range sites within the WSA.

## Threatened and Endangered Species

Potential habitats for Abronia bigelovii (Bigelow verbora-wildflower), Pediocactus papyracanthus (blue grama cactus) and Astragalus kentrophyta var. neomexicana (New Mexico kentrophyta-wildflower) exist in this WSA (Knight 1982).

## WILDLIFE

San Luis Mesa, in the southern portion of the La Lena WSA, is ideal raptor (bird of prey) nesting habitat. At least one golden eagle nest and one great-horned owl nest occur within the WSA (USDI, BLM 1981). Other raptors observed nesting on San Luis Mesa outside of the WSA include prairie falcons and red-tailed hawks (within a mile of the WSA), ravens and kestrels.

A small population of mule deer reside in the WSA, although their habitat is marginal. Other wildlife observed in the WSA include coyote, gray fox, blacktailed jackrabbit, Gunnison's prairie dog, and scaled quail. A complete listing of species inhabiting the WSA can be found in the Run Wild computer printout (USDA, FS 1982) for Sandoval County, on file in the Rio Puerco Resource Area.

## VISUAL RESOURCES

Scenic views of Cabezon Peak are possible from within the La Lena WSA. Also visible are an expansive rolling valley cut by washes and arroyos, and evidence of past volcanic activity that includes Mesa Chivato and the volcanic plugs surrounding it.

Using the BLM's 1978 Proposed Rio Puerco Grazing Management System ES, the BLM's Visual Resource Management (VRM) System the La Lena WSA has been divided into two management units. The southern half is rated VRM Class III, and the northern half VRM Class IV (refer to Enclosures 1 and 2 of this appendix for a further description of these classes).



TABLE D-2  
SOILS, LA LENA WSA

Unit <sup>a/</sup>	Soil Type	Percent Slope	Acres
Ak	Alkali Alluvial Land	-	184
Bf	Berent-Sandstone Outcrop Association	-	615
Cg	Christainburg Clay and Gullied Land	-	23
Fs	Fruitland-Slickspot Association	-	139
Lc	Las Lucas Loam	0-5	48
Le	Las Lucas Soils	5-9	862
Lp	Las Lucas-Persayo Association	-	557
Pf	Penistaja Pine Sandy Loam	0-5	292
Pn	Penistaja-Berent Association	-	378
Rk	Ravala Silty Clay Loam Alkali and Gullied Land	-	640
Rt	Rock Outcrop-Travessilla-Persayo Association	-	5,636
Sv	Shavano-Berent Association	-	1,036

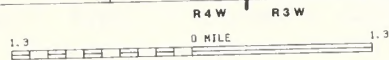
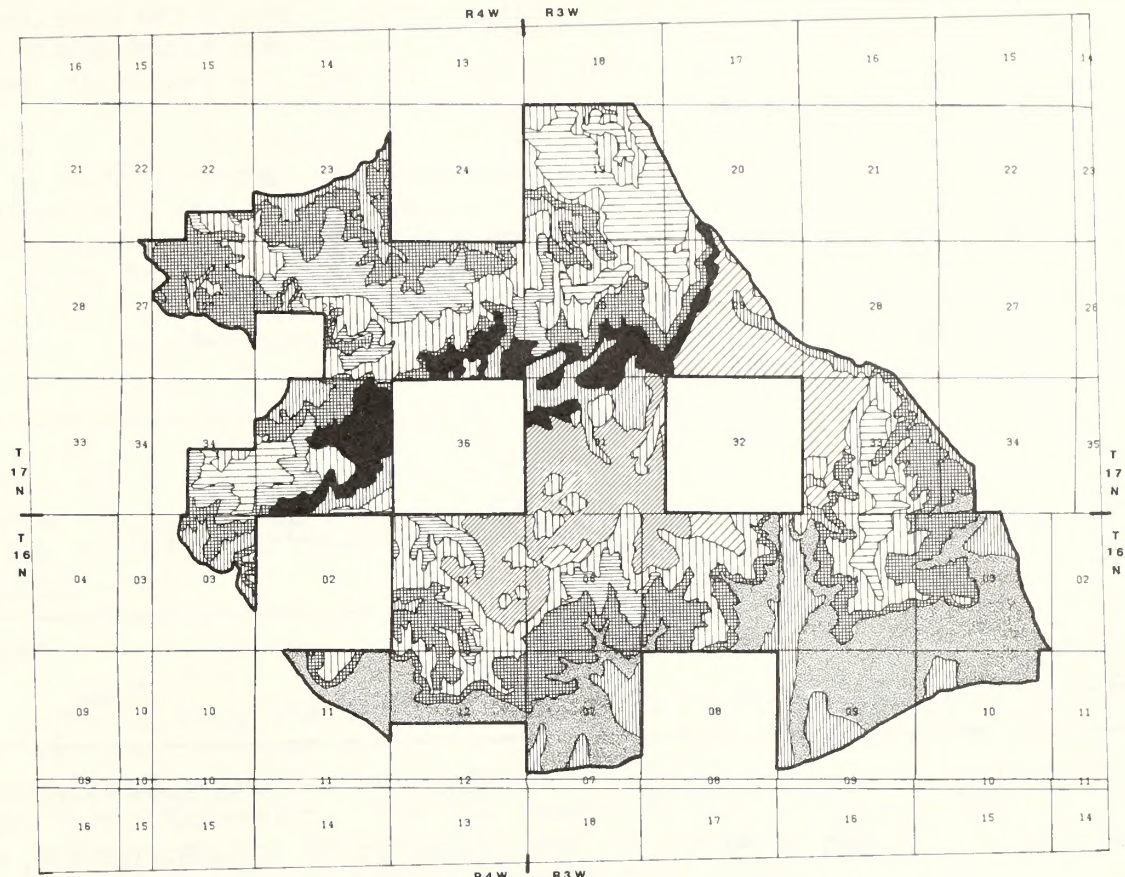
<sup>a/</sup> Units correspond to a soils map on file in the Rio Puerco Resource Area.

TABLE D-3  
VEGETATION, LA LENA WSA

Range Site Number	Ecotype	Slope Percent	Aspect	Vegetative Cover (Percent)	Carrying Capacity Acres/AUM	Range Condition	Present Vegetation Species	Potential Perennial Plant Density (#)	Production (lbs/ac)	Potential Vegetation Species	Related Soil Type
1	Grama-galleta steppe	Less than 1	N, S, E, W	21	9.28	Good	Alkali sacaton, fourwing salt-bush, black greasewood	25-30	900	Alkali sacaton, giant sacaton, blue grama, vine mesquite, galleta grass	Christiansburg Clay on Gullied land, Las Lucas-Persayo and Barola Silty Clay Loam, Alkali
2	Juniper-pinyon woodland	36	N, S, W	11	29.43	Poor	Alkali sacaton, shadscale, galleta grass	10	475	Alkali sacaton, sideoats grama, Indian rice-grass, Bigelow sage, galleta grass	011-Trave-silla-Shingle, Eroded-Rock Outcrop Complex
3	Juniper-pinyon woodland	3	N, S, W	27	8.68	Poor-fair	One-seed juniper, big sagebrush, blue grama	15	450	Alkali sacaton, blue grama, Indian rice-grass, little blue-stem, one-seed juniper	Rock Outcrop-Trave-silla-Persayo Association
4	Great Basin sagebrush	1	N or nearly flat	20	10.27	Poor	Galleta grass, big sagebrush, blue grama	20	60-80	Indian rice-grass, bottlebrush squirrel-tail, antelope bitterbrush, big sagebrush	010-Trave-silla-Shingle Outcrop Complex
5	Grama-galleta steppe	2	S and nearly flat	18	13.03	Poor-good	Broom snake-weed, galleta grass, blue grama	30	650	Western wheatgrass, big sagebrush, galleta grass, mutton blue-grass, blue grama	Shavano-Berent Association
6	Grama-galleta steppe	4	W	16	13.00	Fair	Galleta grass, red threeawn, broom snakeweed	23	600	Blue grama, Indian rice-grass, spike dropseed, sand dropseed	Shavano-Berent Association
7	Grama-galleta steppe	4	S, W	10	4.70	Poor-fair	Alkali sacaton, galleta grass, broom snakeweed	20	440	Black grama, blue grama, Indian rice-grass	Penistaja Bond Association



# VEGETATION, LA LENA WSA



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RANGE SITE 1 - 1156 ACRES  
 RANGE SITE 2 - 2212 ACRES  
 RANGE SITE 3 - 1848 ACRES  
 RANGE SITE 4 - 769 ACRES  
 RANGE SITE 5 - 576 ACRES  
 RANGE SITE 6 - 843 ACRES  
 RANGE SITE 7 - 550 ACRES  
 RANGE SITE 8 - 790 ACRES  
 RANGE SITE 9 - 1602 ACRES  
 TYPE LINES



MAP D-3

## CULTURAL RESOURCES

Cultural resource inventory within the La Lena WSA consists of reconnaissance of one section (640 acres) and several small (5-acre or less) in-house surveys in support of various BLM projects. Five sites were located by Eastern New Mexico University in 1976. Three of the sites are clearly Navajo (two sweat lodges and a livestock corral), and the remaining two are lithic scatters of indeterminate cultural affiliation.

A minimum of 150 sites can be projected within the boundaries of this WSA, though actual site density may exceed this estimate. High site densities (particularly Navajo) are recorded on Torreon Wash immediately north of the WSA boundary, and probably continue into the northern periphery of the La Lena WSA. Some evidence of use by Archaic, Prehistoric Pueblo, Pueblo and contemporary peoples exists within this WSA (refer to Table D-4).

TABLE D-4

ARCHAEOLOGICAL SEQUENCE FOR THE RIO PUERCO RESOURCE AREA  
(After Dittert, 1959)

Cultural Type	Time	Cultural Period	Time
PaleoIndian	Before 250 B.C.	Pueblo II	870-950 A.D.
Archaic	Before 250 B.C.	Pueblo II	950-1100 A.D.
	700 B.C. (500-700 BMIII)	Pueblo III	1100-1200 A.D.
Basketmaker	700 A.D. 800 A.D.	Pueblo III-IV	1200-1400 A.D.
		Pueblo IV	1400-1600 A.D.
Pueblo I	800-870 A.D.	Pueblo V	1600-Recent

## AIR QUALITY

Under the Clean Air Act (as amended, 1977), BLM-administered lands have been given a Class II air quality classification. This class allows moderate deterioration associated with moderate, well-controlled industrial and population growth.



## SECTION 3

## EXISTING AND POTENTIAL USES

## MINERAL DEVELOPMENT

No exploration or development activity associated with locatable, leasable, or salable minerals is occurring within the boundaries of the La Lena WSA. As of August 1982, a total of 551 mining claims have been staked within the WSA, and 18 oil and gas leases issued. No mines or wells exist within the WSA boundaries, and the level of exploration activity has been low.

Table D-1 (Section 2) indicates that the highest potential for development is associated with the coal and humates that occur in the Mesaverde Group. The geologic environment, inferred geologic processes, reported mineral occurrences, and known mines or deposits indicate a high favorability for the accumulation of these two mineral resources. The completion of a successful exploration program could lead to the development of a moderate-sized surface coal mine in the northern half of the La Lena WSA. All of the other commodities have only a low to moderate potential for development.

## WATERSHED

The La Lena WSA lies in part of the Rio Puerco watershed. The Rio Puerco is one of the major tributaries of the Rio Grande, embracing approximately one-third of the drainage that lies in New Mexico above the Elephant Butte Reservoir. The Rio Puerco supplies one-sixteenth (6 percent) of the waters of the Rio Grande, yet it is the source of over half (56 percent) of the sediment that obstructs the main Rio Grande channel (Waite 1972).

The main drainage bottoms of the WSA are in the latter stages of an erosion cycle that was apparently initiated by sheep and cattle overgrazing in the late 1800's and early 1900's. This use has resulted in extensive sheet, rill, and gully erosion in all areas except the steep slopes of mesas. The WSA is especially vulnerable to upland erosion because of sparse vegetation, relatively steep slopes, and the occurrence of violent thunderstorms. During a six-year study, Leopold (1966) found that upland sheet erosion was the most significant source of sediment in a semiarid area of New Mexico.

The Arroyo Empedrado (Rock Basin) watershed is presently being intensively monitored. Gages now measure rainfall runoff and sediment from each event. Vegetation studies include utilization by livestock, range condition, trend, and production as part of a research project in conjunction with the U.S. Forest Service, Rocky Mountain Forest and Range Experimental Station. This project is designed to monitor and document quantitative change in runoff and sediment discharge from rangelands subject to intensive grazing. The results of this monitoring will be used for predicting hydrologic response to grazing management in future BLM planning and environmental studies.



## LIVESTOCK GRAZING

Five grazing allotments contain acreage within the boundaries of the La Lena WSA (refer to Map D-4). Of these five allotments, three have acreage in the adjoining Empedrado WSA. The La Lena WSA supports approximately 1,410 Animal Unit Months. Table D-5 displays grazing information pertaining to these five allotments.

Most of the operators who graze livestock in the WSA ranch as a second income or to continue family tradition; ranching is not their primary source of income. They live in the vicinity of Cuba and Albuquerque, near their primary source of income. Therefore, they can attend to their grazing allotments only on weekends, and the pickup truck has become increasingly important as a livestock management tool.

TABLE D-5  
RANGE ALLOTMENT INFORMATION

Allotment Name	Number	Total Acres	WSA Acres	Number of Permittees	Authorized Livestock Use	Season of Use
Torreon Wash	0035	7,976	1,396	1	88 head	Yearlong
Arroyo Empedrado	0036	4,536	1,042	2	59 head	Yearlong
Cerro Cuate	0041	3,886	1,701	1	58 head	Yearlong
Brandy (San Luis Place)	0010	12,604	2,755	1	188 head	8 months
Twin Butte	0034	12,588	3,416	2	121 head	Yearlong

Torreon Wash Allotment (#0035)

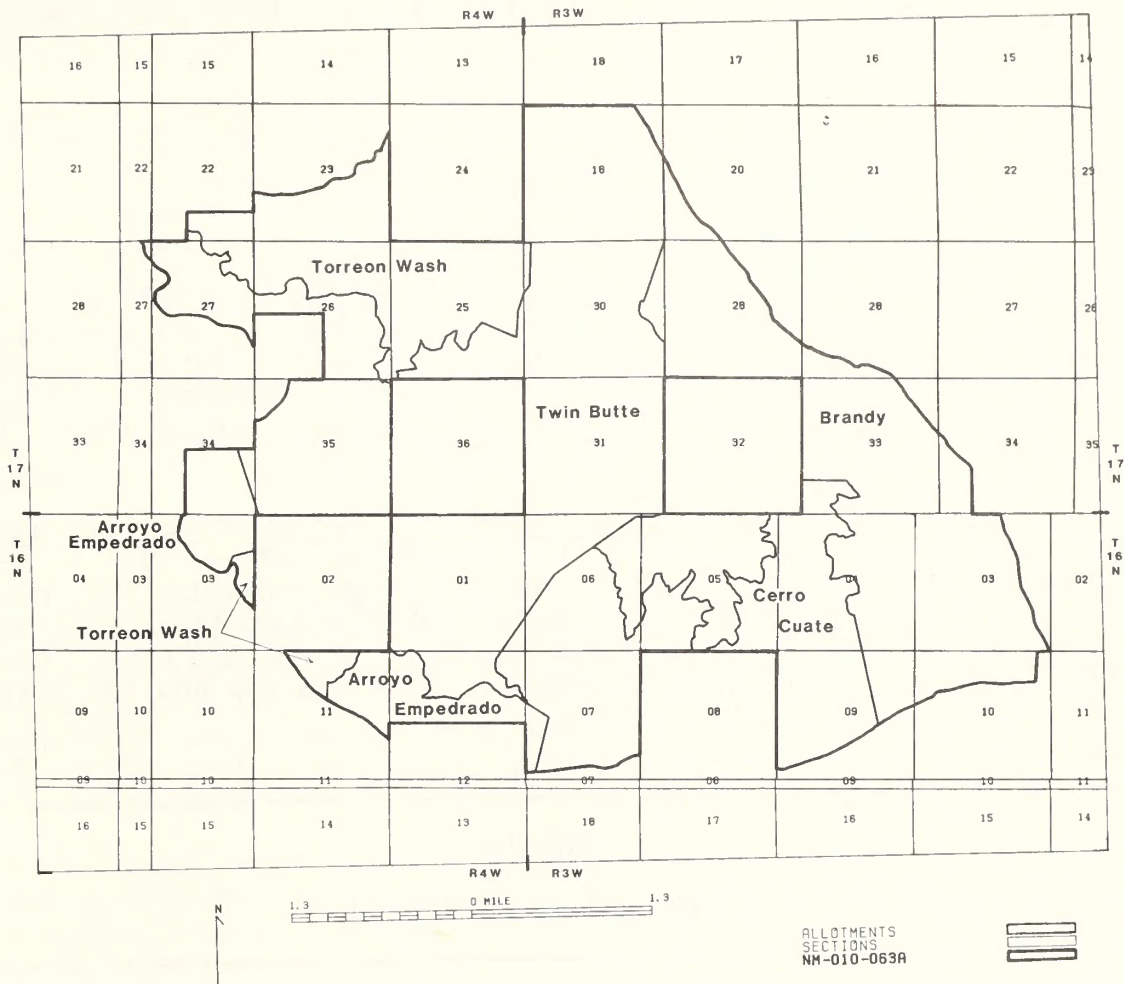
Of this allotment's five pastures, one pasture has acreage within the La Lena WSA. Livestock graze within the WSA for approximately 5 months of the yearlong season. No new range improvements are planned for construction within the WSA to implement the Allotment Management Plan (AMP).

Arroyo Empedrado Allotment (#0036)

Of the three pastures that make up this allotment, two have acreage within this WSA. No new range improvements are proposed for construction within the La Lena WSA to implement the AMP.



# RANGE ALLOTMENTS, LA LENA WSA



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MAP D-4

Cerro Cuate Allotment (#0041), Brandy Allotment (San Luis Place - #0010), and Twin Butte Allotment (#0034)

All the range improvements needed to implement the AMP on these three allotments have been constructed. No additional improvements are proposed.

#### FOREST PRODUCTS

Some potential for home use fuelwood may exist. Limited fuelwood trespass has been reported.

#### RECREATION

The BLM has no visitor use data for the La Lena WSA. The primary recreation use is believed to be some big game hunting and its associated activities -- camping, ORV use, and hiking. Possible activities not directly associated with hunting include rock-hounding, horseback riding, and photography. Letters received by the BLM show that scenic and geological sightseeing also occur.

In the Proposed Rio Puerco Livestock Grazing Management System ES (1978), the BLM utilized the Recreation Information System (RIS) to describe the existing recreation environment. The RIS is an evaluation that rates the quality of experience a visitor can expect while participating in a specific activity. The La Lena WSA lies within the Chico Arroyo RIS unit. Table D-6 describes the key factors used to evaluate each activity and the activity's quality rating.

TABLE D-6

#### SCENIC QUALITY EVALUATION

Activity	Quality Rating in	
	Chico Arroyo	
	RIS Unit	Key Factors
ORV use	High	Soil, size, hazards, usability
Sightseeing (Scenery)	Medium	Landform, color, water, vegetation, uniqueness, intrusions
Primitive Values	Low	Scenic qualities, size, intrusions, wildlife, fisheries, water usability, uniqueness



## EDUCATION/RESEARCH

The Arroyo Empedrado watershed is presently being intensively monitored for runoff, sediment, and vegetation production in order to improve grazing management practices. Educational-interpretive potential exists in the Empedrado WSA in the form of a "natural laboratory" for the observation and study of natural systems.

## NATIVE AMERICAN USES

Native Americans (particularly nearby Navajo, Jemez, Zia, and Santa Anapeoples) have traditionally used the area for firewood gathering and hunting. Recent survey near the WSA and interviews with officials of the Jemez, Zia, and Santa Ana Pueblos, and the Canyoncito Navajo Reservation generally show that many places of religious significance exist in and near the La Lena WSA. Specific site locations are not known to the lay members of the tribes, because only tribal elders know of and watch over such sites. Apparently it would be indiscreet for the secular governments to propose a survey or to provide any information of such an esoteric nature. Traditional Native American uses within the boundaries of this WSA will probably continue.

## WILDLIFE

Adequate nesting habitat exists in the La Lena WSA to support greater numbers and kinds of raptors. San Luis Mesa is considered to be one of the most important nesting areas within northwest New Mexico for at least six species of raptors (birds of prey) (USDI, BLM 1981). A BLM survey in April 1980 located 15 nest sites including one active golden eagle nest, one active prairie falcon nest, one active great-horned owl nest, and one active red-tailed hawk nest.

A larger prey base is needed, however, before raptors will be attracted to the WSA. This could occur in the future when rodent populations reach a higher level and as range conditions improve as a result of changes in grazing management.

The resident deer herd is probably at its maximum capacity because deer habitat conditions are marginal. Small game (rabbit/quail) numbers would probably increase with improvement in range conditions. Three wildlife watering devices with protective exclosure fences are present in the WSA. One waterfowl development is proposed within the La Lena WSA in a BLM Habitat Management Plan.

Human use of the wildlife resource in the WSA generally includes small game hunting, trapping, and incidental observation. Control of coyotes preying on livestock has occurred in the past and will probably be requested by livestock operators in the future.





## SECTION 4

## WILDERNESS CRITERIA

## EVALUATION OF WILDERNESS VALUES

Quality of Mandatory Wilderness Characteristics

## Naturalness

A detailed description of the imprints of man's work in the La Lena WSA is documented in the Wilderness Intensive Inventory (USDI, BLM 1980). These imprints include a fenceline network, three earthen dams, three drill pads, and nine two-track ways. The BLM considers the overall effects of these imprints upon the entire WSA when assessing naturalness, which is a function of the size of the unit and the number and distribution of impacts.

The drill pads are in the process of natural revegetation, and the retention dams blend well with the existing environment because they have begun to silt in and revegetate. The two-track ways are maintained solely by vehicular travel and would return to a natural condition if use were discontinued. Several routes are no longer visible since they were identified during the wilderness intensive inventory.

The WSA as a whole appears to have been affected primarily by the forces of nature, and is assessed as exhibiting the wilderness characteristic of naturalness.

## Solitude

The BLM defines solitude as the state of being alone, removed from habitation, or isolated. In the La Lena WSA, the feeling of being isolated from others is enhanced by the steep-sided San Luis Mesa and numerous arroyos (refer to Figure 2). These features allow visitors to be screened from one another and avoid evidence of others. Although the opportunity to experience solitude exists within the La Lena WSA, it cannot be properly described as outstanding.

## Opportunities for Primitive and Unconfined Recreation

The BLM views primitive and unconfined recreation as the potential a WSA has to provide opportunities for a diversity of possible activities or an activity of outstanding quality. The quality of these opportunities on the La Lena WSA are considered to be marginal.

Special Features

The San Luis Mesa raptor habitat is the predominant special feature located in the La Lena WSA (refer to Figures 3 and 4). Some cultural resource sites also have been noted.



Figure 2 - Across Arroyo Chico from the Empedrado WSA stands the steep-sided, sandstone-capped San Luis Mesa of the La Lena WSA.



Figure 3 - The predominant natural character of the La Lena WSA and superb raptor habitat support several species of birds of prey.





Figure 4 - Pinyon-juniper-topped San Luis mesa rests above the sloping flatlands of the La Lena WSA. The mesa is being recommended for special designation because of its fine raptor habitat.

## Multiple Resource Benefits

The La Lena WSA contains some natural values as a result of its relatively undisturbed character. Congressional designation as wilderness would carry the weight of law and would provide a greater degree of long-term protection for these natural values than would the administrative designations available to the BLM. A more detailed discussion of multiple resource benefits may be found in Section 6 of this appendix (refer to the discussion of impacts of the All Wilderness Alternative).

## Diversity In The National Wilderness Preservation System

### Ecotypes Present

The La Lena WSA, according to Robert G. Bailey (USDA, FS 1980), falls under the Dry Domain in the Highland Province, and the Colorado Plateau Sub-Province. This sub-province can be further subdivided into two sections: Juniper-Pinyon Woodland and Sagebrush-Saltbush Mosaic, and Grama-Galleta Steppe and Juniper-Pinyon Mosaic.

The three A.W. Kuchler types (1964) found in the WSA are described as follows.

Grama-Galleta Steppe. Total acres in the WSA are approximately 3,469 (34 percent of the WSA).

Juniper-Pinyon Woodland. Total acres in the WSA are approximately 5,961 (58 percent of the WSA).

Great Basin Sagebrush. Total acres in the WSA are approximately 880 (8 percent of the WSA).

Map D-5 displays these ecotypes. Vegetation Map D-3 (Section 2) breaks each ecotypes into more refined range site categories described in Table D-3 (Section 2 of this appendix).

## Distance from Major Population Centers

The La Lena WSA is within a day's drive (5 hours) of Bernalillo County and part of Sandoval County, which have been identified in the 1980 census (USDI, BC 1981) as a Standard Metropolitan Statistical Area.

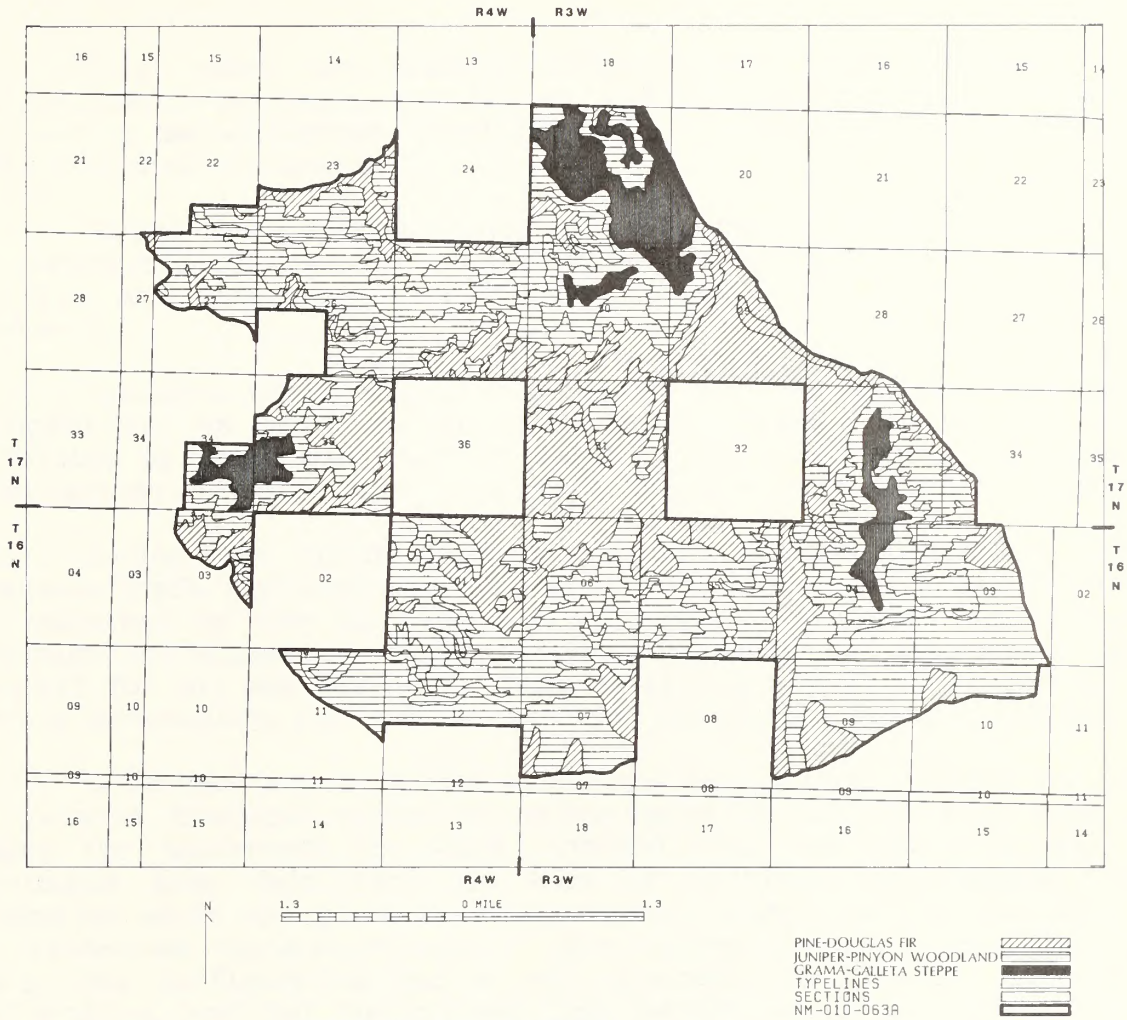
## MANAGEABILITY

To be recommended as suitable, the La Lena WSA must be capable of being effectively managed as wilderness. To determine manageability, the BLM must consider such factors as private inholdings, state lands, valid existing rights, mineral leases, rights-of-way, topography, and the overall pattern of land status.

Reasonable access must be guaranteed to State of New Mexico inholdings. Based on present use, these access needs would result in the occurrence of generally low levels of use incompatible with wilderness designation.



# ECOTYPES, LA LENA WSA



MAP D-5

The basic land configuration of the La Lena WSA would make it difficult to manage over an extended time period. Private and state parcels intrude into the main land mass of the WSA to the north, west and east. Two state sections in the center of the WSA further break up its contiguous acreage (refer to Map D-1).



## SECTION 5

## PUBLIC INVOLVEMENT OVERVIEW

This report was prepared after public input obtained by large mailings, public meetings, open houses, and personal contacts. These efforts began during the wilderness inventory and will continue during the preparation of the statewide wilderness EIS.

During the wilderness inventory, proponents of WSA status for the La Lena emphasized its natural character, and opportunities for solitude and primitive and unconfined recreation as reasons it should be designated wilderness.

Opponents of WSA status highlighted problems with the land ownership configuration, as well as the presence of human impacts and possible limitations on ranch operations. (Refer to the public response summary for the wilderness intensive inventory, located in Enclosure 3 to this Appendix.)

During the public comment period on the Albuquerque District Wilderness Draft Environmental Assessment (USDI, BLM 1983), 30 public inputs were received on the La Lena WSA. Thirteen of these inputs expressed opposition to wilderness designation, citing lack of naturalness and the potential for oil and gas. One input cited high favorability for coal, and moderate favorability for uranium, thorium, gypsum, oil and gas, and clay.

Seventeen inputs favored wilderness designation, stating the La Lena WSA contains excellent wilderness characteristics and would be even better managed for wilderness by being combined with the Empedrado WSA. Some individuals also felt that an Area of Critical Environmental Concern designation would not guarantee the permanent protection for the WSA's value that wilderness designation would. Some expressed the opinion that the La Lena's land configuration was a poor argument for dropping the WSA from consideration, and that the current land pattern is not a limiting factor to effective management.

Several comments also questioned how effectively the San Luis Mesa raptor area can be protected without wilderness designation. One comment pointed out inconsistencies between Maps D-3, D-5 and the text of the Draft EA; these inconsistencies have been corrected in the Final EA.





## SECTION 6

## ALTERNATIVES AND IMPACTS

This section discusses two alternatives for the La Lena WSA: the All Wilderness Alternative and the No Action Alternative (manage under the existing land use plan). The BLM has also considered other alternatives for this WSA which were not found to be reasonable or beneficial; therefore, these alternatives were dropped.

## ALL WILDERNESS ALTERNATIVE

Under this alternative, the entire 10,310 acres of public land within the La Lena WSA would be recommended as suitable for wilderness designation. If the WSA is designated as wilderness, existing and potential uses would be regulated by the Wilderness Management Policy (USDI, BLM 1981).

Impacts to Wilderness

Wilderness values would be retained and protected over the long term by management under the wilderness management policy. Under the All Wilderness Alternative, the added protection of congressional designation would significantly benefit the wilderness resources present in the La Lena WSA.

Impacts to Minerals

Wilderness designation would eliminate the potential for development of all locatable and leasable minerals that may occur within the La Lena WSA, with the exception of valid existing rights. Although a low to moderate favorability exists for the occurrence of copper, silver, uranium, thorium, gypsum, bituminous rock, sand, gravel, clay and petrified wood, and a high favorability for humates and coal, the designation of the La Lena WSA as wilderness would curtail exploration and prevent possible future extraction. Under present economic conditions, little demand exists for the extraction of copper, silver, uranium, thorium, bituminous rock, molybdenum, gold, or clay from the La Lena WSA's reserves.

Although gypsum, sand, gravel, and humates occur throughout northern New Mexico, any of these resources located in the La Lena WSA would be considered economically attractive regionally. This is because extraction near the source of utilization is essential to achieving an acceptable profit margin.

Assuming favorable economic conditions, a moderate-sized surface coal mine could be developed. This option would be precluded by wilderness designation. The impacts to the minerals industry over the long term could be significant due to the prohibition against developing coal and locatable minerals, for which a moderate favorability exists in the WSA.

## Impacts to Other Resources and Uses

The All Wilderness Alternative would not have significant impacts on forest products, air quality, and realty actions in the La Lena WSA. For this reason, these resources are not included in the following discussion.

### Soils, Watershed and Vegetation

Restrictions on surface-disturbing and mechanized activities would help provide long-term protection for watershed, soils, and vegetation, including threatened and endangered plant species. Impacts to these resources under this alternative would not be significant.

### Wildlife

Restrictions on surface-disturbing and mechanized activities could help prevent decreases in wildlife populations. This would particularly benefit the San Luis Mesa raptor habitat. However, restraints on methods of animal damage control could occur. The impacts to wildlife under this alternative would not be significant.

### Visual Resources

The visual resources of the La Lena WSA would be protected. Under this alternative, the entire WSA would receive VRM Class I management, which would restrict visual modifications to a minimum. Thus, this alternative would result in no significant impacts to visual resources.

### Cultural Resources

Site condition monitoring associated with surveillance could prove beneficial because over 80 percent of the Rio Puerco Resource Area's known sites suffer from significant natural deterioration. It is assumed that enhanced monitoring would take place under wilderness management; this could increase the ability to detect, and if warranted, to arrest serious deterioration of sites at relatively early stages. Inventory and evaluation of those cultural resources within the WSA could also increase.

Most surface-disturbing activities would not be allowed under wilderness designation. This prohibition could limit the destruction of cultural sites through other than natural causes.

The wilderness management policy allows the natural decay of sites. Excavation and stabilization may be permitted on a case-by-case basis by the State Director where the project would not degrade the overall wilderness character and when such activity is needed to preserve the particular cultural resource. Overall, wilderness designation would have no significant impact on cultural resources.

### Livestock Grazing

The existing levels of livestock grazing would continue under wilderness designation. Wilderness designation would not prevent an increase in AUMs based on existing Allotment Management Plans.



Livestock operations in the La Lena WSA would be affected by wilderness designation. These effects would result from limitations imposed on the maintenance of existing range improvements. Although grazing is an activity compatible with wilderness, limitations on vehicle access, type of construction materials, or location of new improvements may occur in order to protect wilderness characteristics.

A major impact to the allottees holding permits in the La Lena WSA could occur because of limitations on the use of motorized vehicles in designated wilderness areas. Wilderness designation would hinder the effective use of already limited time to tend to weekend ranching operations. Overall, wilderness designation would have no significant impact on livestock operations in the La Lena WSA.

#### Recreation

Recreation activities that require motorized vehicles would be affected, including some hunting and motocross activity. However, this use in the La Lena WSA is limited, so wilderness designation under this alternative would have no significant impact on recreation.

#### Education/Research

Wilderness designation would ensure the preservation of the existing "natural laboratory" in the La Lena WSA. This preservation would be a significant beneficial impact to the opportunity for education and research.

#### Native American Uses

Restrictions on vehicular access could limit Native American uses. However, the preservation of solitude and naturalness could enhance the use of the La Lena WSA for religious purposes, because they are often dependent on a primarily natural setting. The impact of this alternative on Native American uses of this WSA is unquantifiable.

#### NO ACTION ALTERNATIVE

In the Albuquerque District Wilderness Draft Environmental Assessment, the Wilderness Analysis Report for this WSA (Appendix C) included an alternative to amend the existing land use plan (the No Wilderness Alternative). Since the Draft's publication in March 1983, a comprehensive land use planning effort has been initiated in the Rio Puerco Resource Area. This effort is called a Resource Management Plan (RMP). The La Lena WSA is now being considered in the tentative alternatives of the RMP as a Special Designation Area. As a result, the scope of the No Action Alternative for this WSA has been changed to include the previously separate No Wilderness Alternative.

Until Congress makes its decision on wilderness designation, the WSA will be managed under the Final Interim Management Guidelines for Lands Under Wilderness Review (USDI, BLM 1983). If Congress designates it as wilderness, the WSA will be managed under the Wilderness Management Policy (USDI, BLM 1981).

If the WSA is not designated as wilderness, it will be managed under the No Action Alternative, which would involve management under other than wilderness policy. Management would follow the guidelines of the Rio Puerco RMP. The RMP is expected to be approved in late 1985 while the wilderness study process is still underway. Therefore, the RMP decision concerning this WSA may be incorporated into the Wilderness Study Report to be written later in the process. The tentative RMP proposal for the La Lena WSA currently emphasizes management for the WSA's raptor habitat.

If the approved RMP does not include a special designation for any portion of the La Lena WSA, the WSA would be managed under the No Action Alternative according to multiple use concepts without stressing raptor habitat values. The most probable uses of the La Lena WSA would be livestock grazing, mineral exploration and development, and ORV use.

#### Impacts on Wilderness Values

Mineral exploration and development, increased ORV activity, and increased use of motorized vehicles would result in the disruption of wildlife habitat (including San Luis Mesa's important raptor habitat), scenery, and vegetation as well as reduce the opportunity to experience solitude. Over time, all of these uses could be expected to significantly impact naturalness, and degrade or eliminate the La Lena WSA's wilderness character.

#### Impacts on Other Resources and Uses

The No Action Alternative would not have significant impacts on recreation, air quality, realty actions, livestock grazing, or minerals. For this reason, these resources are not included in the following discussions.

##### Soils, Watershed, and Vegetation

Continued vehicular access and other surface disturbing activities could result in additional ruts and create the potential for reduced watershed quality. This occurrence would also degrade soils and vegetation.

##### Wildlife

Management without any special protective wildlife stipulations could result in an increase in human activities, thus significantly impacting those wildlife species dependent on a predominantly unmodified ecosystem, such as nesting raptors.

##### Cultural Resources

Continued vehicular access would allow the potential for vandalism, but would also provide for more frequent vehicular patrol and monitoring. Cultural resources would be vulnerable to increased surface-disturbing activities. These impacts could be mitigated by a wide variety of management options other than wilderness, such as withdrawals and closures, as well as specific site or area cultural resource management plans. The No Action Alternative would have little impact on the cultural resources.



### Education/Research

The natural setting, which supports the special features of scenery and raptor habitat, could be subject to increased surface disturbance and disruption by vehicular access. This would significantly impact the La Lena WSA's potential for use as a "natural laboratory".

### Native American Uses

The natural settings on which Native American uses are often dependent could be subject to surface-disturbing activities. The impact under this alternative to Native American uses of the La Lena WSA is unquantifiable.

### Visual Resources

Existing visual resources could be significantly impacted as a result of surface-disturbing activities (e.g., mineral development) allowed under non-wilderness management.





## ENCLOSURE 1

### CRITERIA FOR VISUAL RESOURCE MANAGEMENT CLASSES

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- Class I - Applies only to classified special areas, e.g., roadless, wilderness, primitive, natural areas, etc. This quality standard is established through legislation or policy. Only natural ecological changes are allowed.
- Class II - Landscapes with Class A scenery quality, or Class B scenery quality in the foreground/middleground zone with high visual sensitivity. Changes in any of the basic elements (form, line, color or texture) caused by a management activity should not be evident in the characteristic landscape.
- Class III - Landscapes with Class B scenery quality and high visual sensitivity in the background visual zone, or with Class B scenery quality and medium visual sensitivity in the foreground/middleground visual zone or with Class C scenery of high visual sensitivity in the foreground/middleground zone. Changes in the basic elements (form, line, color, texture) caused by management activity may be evident in the characteristic landscape. However, the changes should remain subordinate to the visual strength of the existing character.
- Class IV - Landscapes with Class B scenery quality and high visual quality sensitivity in the seldom seen visual zone, or with Class B scenery quality and medium or low visual sensitivity in the background or seldom seen zones, or with Class C scenery quality (except with high sensitivity in the foreground/middleground zone). Changes may subordinate the original composition and character but must reflect what could be a natural occurrence within the characteristic landscape.
- Class V - Applies to areas identified in the scenery quality inventory where the quality class has been reduced because of unacceptable intrusions, or to areas that have the potential for enhancement. This classification indicates that change is needed. The class applies to areas where the naturalistic character has been disturbed to a point where rehabilitation is needed to bring it back into character with the surrounding countryside. It should be considered an interim short-term classification until one of the other objectives can be reached through rehabilitation or enhancement. The desired visual quality objectives should be identified.
- 

Source: After BLM Manual 6310 (U. S. Department of the Interior, Bureau of Land Management, 1975).

## ENCLOSURE 2

### VRM CLASS RATINGS

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"The purpose of a Visual Resource Management (VRM) Class is to reduce the visual impacts of developed activities and to manage the quality of the visual environment."

VRM classes are determined by combining the ratings from scenic quality classes, visual sensitivity levels, and distance zones. Scenic quality classes are rated for landform, water, color, vegetation, intrusions and uniqueness. These elements are combined and the area is quantified as one of the following classes:

Class A - Unique, outstanding features

Class B - Outstanding features common to the physiographic region

Class C - Features common to the physiographic region

Sensitivity levels are determined by frequency of travel through an area, use of area, and public knowledge of the area. These elements are rated and assigned a high, medium or low sensitivity level.

Distance zones are placed in three categories: foreground/middleground zone, background zone, seldom seen zone. The foreground/middleground zone is closer to the view and requires more attention and consideration in management decisions because of the great detail that can be seen in the landscape. The background and seldom seen zones are less detailed to the viewer and most impacts blend with the landscape because of the distance viewed from.

Ratings from scenic quality classes, visual sensitivity levels and distance zones are combined to form VRM classes. The VRM class identifies the suggested degrees of human modification that should be allowed in a certain landscape. See Enclosure 1 for definitions of each VRM class.

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## ENCLOSURE 3

## PUBLIC RESPONSE SUMMARY--LA LENA (NM-010-63a)

FAVOR <u>Wilderness Study<sup>a/</sup></u>			OPPOSE <u>Wilderness Designation or Wilderness Study Status</u>		
I 10	S 10		I 3	S 8	
<u>I</u>	<u>S</u>	<u>Supporting Reasons</u>	<u>I</u>	<u>S</u>	<u>Supporting Reasons</u>
3	3	Meets Naturalness Criterion	1	6	Does Not Appear to be Natural
3	3	Offers Opportunities for Solitude	1	1	Resources Conflicts
3	3	Offers Opportunities for Recreation	1	1	No Supporting Reasons Offered
1	1	Manageable as Wilderness			
7	7	No Supporting Reasons Offered			
<u>I</u>	<u>S</u>	<u>FORM LETTERS &amp; PETITIONS</u>	<u>I</u>	<u>S</u>	<u>FORM LETTERS &amp; PETITIONS</u>
2,524	2,659	Endorsements of Conser- vationist Proposal			
1	615	Petition Endorsing Con- servationalist Proposal			
<u>SEQUENCE NUMBERS</u>			<u>SEQUENCE NUMBERS</u>		
C015	H028		G025		
K018	S035		G011		
F014	D010		G011		
L022	S047				
K017					
L020					
W033					

Note: <sup>a/</sup> I = inputs; S = signatures.





# APPENDIX E

WILDERNESS ANALYSIS REPORT

OJITO WILDERNESS STUDY AREA

NM-010-024  
ALBUQUERQUE DISTRICT

RIO PUERCO RESOURCE AREA







## SECTION 1

## GENERAL DESCRIPTION

## LOCATION

The Ojito Wilderness Study Area (WSA; NM-010-024) contains approximately 11,919 acres of public land, and is located approximately 5 miles southwest of the village of San Ysidro. It is delineated on the north by property boundaries, on the south by a combination of a gas pipeline right-of-way and a maintained road, on the west by a powerline right-of-way, and on the east by a combination of a maintained road and a ridgeline (refer to Maps E-1 and E-2).

The U.S. Geological Survey topographic maps that cover this WSA are Ojito Spring, San Ysidro, Sky Village NE, and Sky Village NW (7.5-minute quadrangles).

## CLIMATE AND TOPOGRAPHY

The Ojito WSA lies at the approximate center of northwestern New Mexico. Physiographically, the WSA is in the Navajo Section of the Colorado Plateau Province. The Navajo Section is characterized by outcrops of sandstone with lesser amounts of shale that have been subjected to intensive arid-cycle erosion. Landforms in this region include mesas, cuestras, rock terraces, retreating escarpments, canyons, arroyos, and badlands.

Approximately 600 feet of relief exist in the Ojito WSA. From a low elevation of 5,650 feet in Querencia Arroyo, the terrain reaches up to 6,261 feet on a mesa top in the northwestern part of the WSA. Principal landforms in the Ojito WSA are Bernalillito Mesa and the southern end of Cucho Mesa. The major drainages found in the WSA are Cucho Arroyo, Querencia Arroyo, Arroyo Bernalillito, and Arroyo La Jara. The overall geomorphology of the WSA is formed by arroyos cutting sandstone-capped mesas.

Precipitation averages 10 inches annually, with the majority occurring during July through October. The driest month of the year is April. The temperature extremes vary from 0 degrees to over 100 Fahrenheit, with July being the hottest month and December the coldest month. The average frost-free period is 148 days.

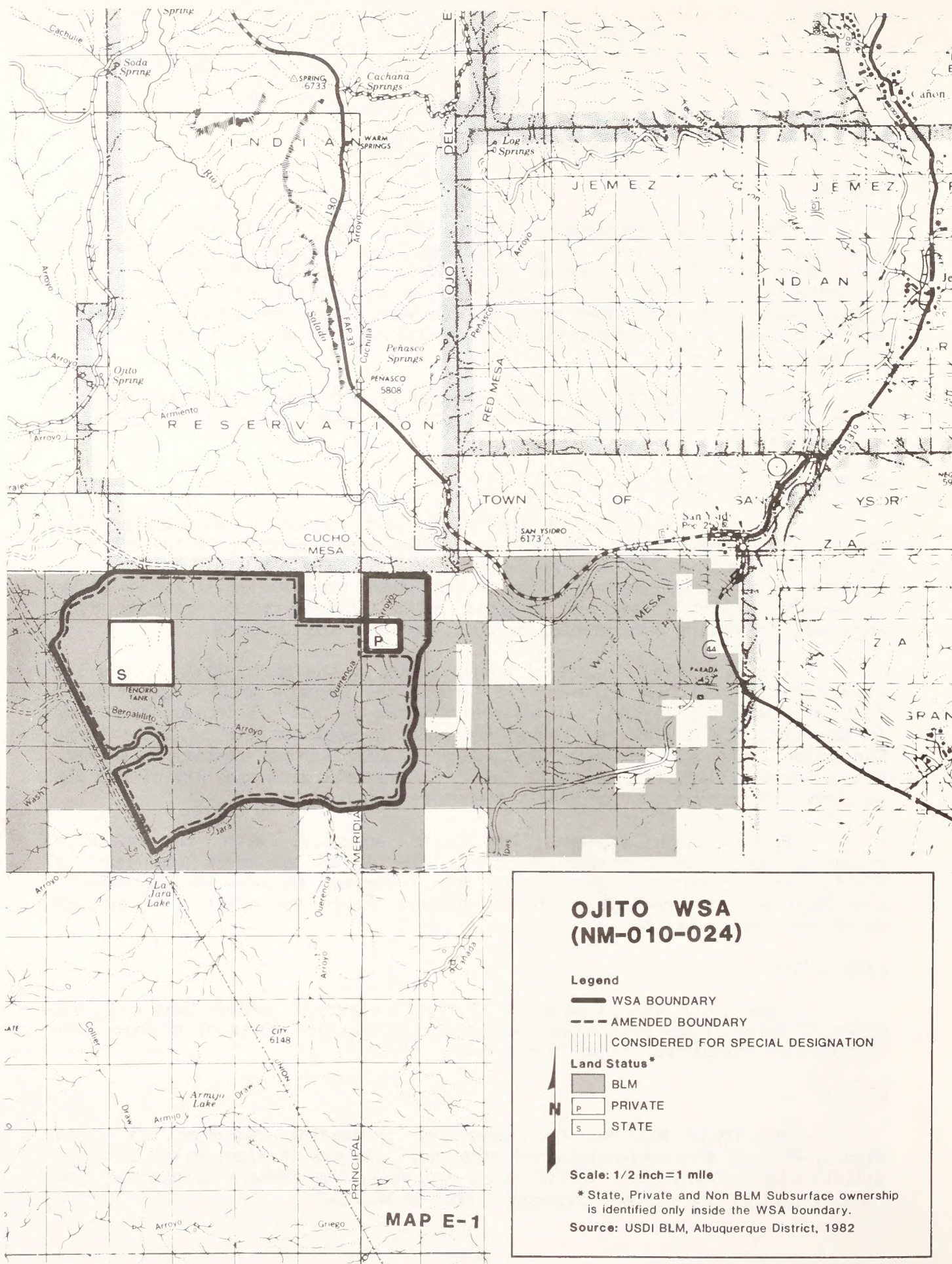
## LAND STATUS

The Ojito WSA is made up of 11,919 acres of public land with 640 acres of State of New Mexico land and approximately 160 acres of private land included as inholdings (refer to Map E-1).

## ACCESS

The Ojito WSA can be reached by proceeding southwest off State Highway 44 onto a county-maintained dirt road. Access is also available along utility right-of-way roads to the south and west, and along a maintained road forming part of the eastern boundary (refer to Map E-2).





## OJITO WSA (NM-010-024)

### Legend

- WSA BOUNDARY
- AMENDED BOUNDARY
- CONSIDERED FOR SPECIAL DESIGNATION

### Land Status\*

- BLM
- PRIVATE
- STATE

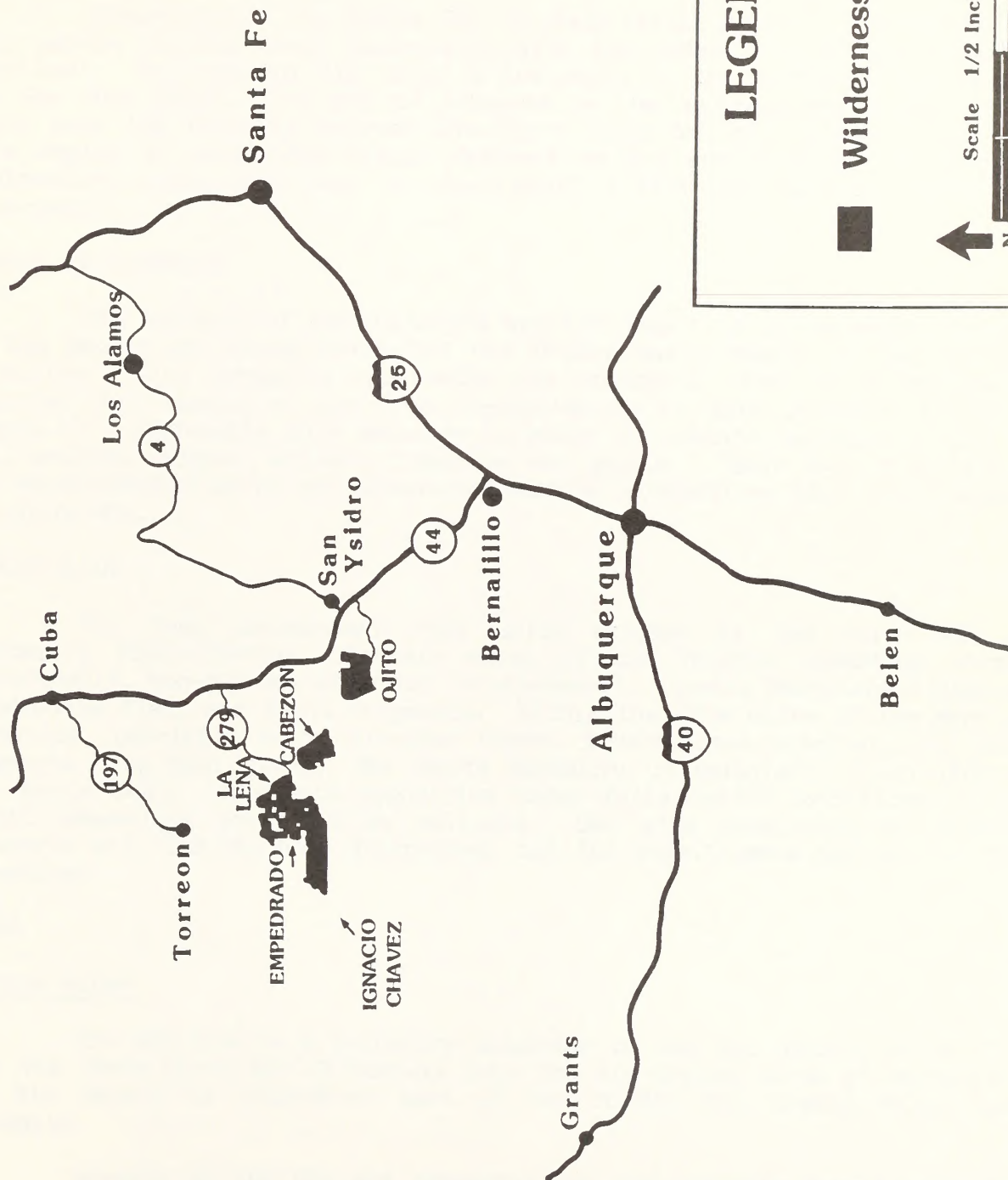
Scale: 1/2 inch=1 mile

\* State, Private and Non BLM Subsurface ownership is identified only inside the WSA boundary.

Source: USDI BLM, Albuquerque District, 1982



# MAP E - 2 GENERAL LOCATION







## SECTION 2

## EXISTING RESOURCES

## GEOLOGY

Structurally, the Ojito WSA is relatively simple. Few faults and only gentle folding occur (associated with the termination of the McCarty's Syncline). The regional dip is at a low angle to the northwest and is into the San Juan Basin. The WSA is situated on the southeastern margin of the basin near the boundary between the Chaco Slope and the Central Basin. In this region of relatively slight deformation and gentle dips, volcanic and sedimentary rocks crop out in many small cliffs and several spectacular escarpments.

## ENERGY AND MINERALS

The badlands of the Ojito WSA are the result of the extensive erosion of the purple and green shales of the Brushy Basin Member of the Morrison Formation. This formation represents the uppermost layer of a sedimentary sequence that ranges in age from Pennsylvanian to late Jurassic (refer to Figure 1). Regionally this sequence is known to contain deposits of oil and gas, uranium, copper, silver, limestone and gypsum. Table E-1 is a list of the stratigraphic units and associated mineral commodities that occur beneath the Ojito WSA.

## PALEONTOLOGY

The four sedimentary rock units exposed in the Ojito WSA are regionally fossiliferous. Certain areas of the Todilto Limestone contain microfossils, non-marine ostracods (crustaceans), aquatic Hemiptera (insects), salmon-like fish, and plant fragments. Within the five units of the Morrison Formation, petrified wood, dinosaur bones, invertebrate material, and plant fragments have been found. The Dakota Sandstone is marginally fossiliferous. The Mancos Shale represents deposition under fully marine conditions, with a fossil assemblage dominated by molluscs. One site consisting of dinosaur vertebrae and ribs has been discovered, but its significance has not yet been determined.

## WATER

Surface Water

The WSA lies in a tributary watershed of the Rio Salado, which flows into the Jemez River and ultimately into the Rio Grande north of Bernalillo. The Rio Salado is considered part of the Middle Rio Grande Major River Sub-Basin.

Arroyos in the WSA are ephemeral and are commonly deeply entrenched into alluvium and shale. Runoff occurs at many times throughout the year, but volumes vary enormously depending on season. Peaks commonly occur during the summer and early fall months, which coincide with the rainy season from July

Figure 1

**Stratigraphic Section,  
Cabezon, Empedrado, Ignacio Chavez,  
La Lena, and Ojito Wilderness Study Areas**

ERA	SYSTEM OR PERIOD	GROUP	FORMATION OR MEMBER	LITHOLOGY
CENOZOIC	QUATERNARY		PEDIMENT	
	TERTIARY		SANTA FE	
	CRETACEOUS		PICTURED CLIFFS	
			LEWIS	
			CLIFF HOUSE	
			MENEFEE	
			POINT LOOKOUT	
		MESAVERDE	CREVASSE CANYON	
			GALLUP	
			MANCOS	
			DAKOTA	
			BRUSHY BASIN	
	JURASSIC	MORRISON FORMATION	WESTWATER CANYON	
			RECAPTURE	
			BLUFF	
		SAN RAFAEL	SUMMERVILLE	
			TODILTO	
			ENTRADA	
MESOZOIC	TRIASSIC	CHINLE FORMATION	UNNAMED SILTSTONE	
			PETRIFIED FOREST	
			POLEO SANDSTONE LENTIL	
			SALITRAL SHALE TONGUE	
			AGUA ZARCA	
			SAN ANDRES	
	PERMIAN		GLORIETA	
			YESO	
			ABO	
			MADERA	
PALEOZOIC	PENNSYLVANIAN	MAGDA-LENA	SANDIA	
	MISSISSIPPIAN		ARROYO PENASCO	
CAMBRIAN	PRECAMBRIAN		PRECAMBRIAN	



TABLE E-1  
MINERAL RESOURCE ASSESSMENT, OJITO WSA

Mineral Commodity	Geologic Unit	Development Potential
<u>Locatables</u>		
Uranium and thorium	Morrison Formation	4-D
Metals (copper, silver molybdenum and gold)	Agua Zarca Member	3-B
	Abo Formation	3-B
	Madera Formation	3-B
Non-Metallics (gypsum)	Todilto Formation	4-C, NE corner 3-C, remainder
<u>Leasables</u>		
Oil and gas	Sandia Formation	2-C
	Entrada Formation	2-C
	Dakota Formation	2-C
	Gallup Formation	2-C
Geothermal	No specific geologic unit	2-A
Sodium and potassium	No specific geologic unit	2-A
Coal	Dakota Formation	2-A
Bituminous rock	No specific geologic unit	3-C
<u>Salables</u>		
Sand and gravel	No specific geologic unit	4-C
Clay (common varieties)	No specific geologic unit	3-A
Humates	Dakota Formation	3-B
Petrified wood	Morrison Formation	4-B
Cinders	No specific geologic unit	1-B

A - Insufficient Data; B - Indirect Evidence; C - Direct Evidence  
D - Abundant Direct and Indirect Evidence

- 1 - The geologic environment and the inferred geologic processes do not indicate favorability for accumulation of mineral resources.
- 2 - The geologic environment and the inferred geologic processes indicate low favorability for accumulation of mineral resources.
- 3 - The geologic environment, the inferred geologic processes, and the reported mineral occurrences indicate moderate favorability for accumulation of mineral resources.
- 4 - The geologic environment, the inferred geologic processes, the reported mineral occurrences, and the known mines or deposits indicate high favorability for accumulation of mineral resources.

Adapted from GEM Study and Turner, BLM, 1982.

through September. During this period, afternoon thunderstorms may generate tremendous volumes of runoff. Comparison of rainfall data with discharge data for the summer rainy season shows that up to 99 percent of the annual discharge may occur during this period (Craig 1980).

Average annual water yields from the area fall between 0.1 and 0.5 inches (.25 inches average or 2,645 acre feet per year). Yields vary considerably from one year to the next.

#### Ground Water

The Ojito WSA lies within the state-declared Rio Grande Underground Water Basin. One known undeveloped water well is located within the WSA, as well as several springs.

#### SOILS

Soils in the Ojito WSA (refer to Table E-2) are generally unsuitable for successful application of management practices such as range reseeding or earthen pond construction. They are moderately to strongly alkaline, which limits vegetation composition and productivity. All soils are highly susceptible to water erosion, and much of the WSA is undergoing accelerated soil loss.

TABLE E-2  
SOILS

Unit <sup>a/</sup>	Soil Type	Percent Slope	Acres
011	Travessilla-Shingle, Eroded-Rock Outcrop Complex	-	1,622
060	Shingle Complex	3-25	3
080	Billings Variant-Silty Clay Loam	0-5	68
110	Rock Outcrop-Gypsum Land Complex	5-40	382
111	Rock Outcrop-Orthents Complex	-	7,112
130	Sheppard Variant- Unnamed 13 Association	0-5	9
140	Penistaja - Bond Association	-	1,067
170	Kim Loam	3-8	1,656

Note: <sup>a/</sup> Unit numbers correlate to soils map on file in the Rio Puerco Resource Area.



## VEGETATION

Table E-3 summarizes the vegetation located in the Ojito WSA by range site. Refer to Map E-3 for the location of these range sites.

Threatened and Endangered Species

The Ojito WSA offers a high potential for the occurrence of rare plants. In addition to its high relief, it has extensive outcroppings of Todilito gypsum and a variety of Jurassic sandstones. Together, these elements afford a broad spectrum of habitats.

The Todilito gypsum outcroppings are the only known substrate for Bigelow four o'clock (Bigelow verbena-wildflower; Abronia bigelovii). A healthy and extensive population of this species has been located in the WSA. Intermingled with A. bigelovii are considerable numbers of moonpod-wildflower (Selinocarpus lanceolatus) and fleabane-wildflower (Erigeron pulcherrimus var. pulcherrimus). A small population of blue grama cactus (Pediocactus papyracanthus) was also found growing adjacent to and intermingled with clumps of sandhill muhly-grass (Muhlenbergia pungens) (Knight 1982).

The gypsum outcroppings of the WSA are confined to the eastern edge and northeast corner. The western side of the WSA is dominated by mesa tops and rimrock. Knight (1982) found scattered populations of New Mexico kentrophyta-wildflower (Astragalus kentrophyta var. neomexicana) in these areas. This spiny little milkvetch is found in the extensive sandy pockets that occur throughout the broken sandstone bluffs.

## WILDLIFE

Two ecotypes provide habitat for wildlife in the Ojito WSA, the grama-galleta ecotype and the juniper-pinyon ecotype. These are described in Table E-3 (Vegetation).

The U.S. Forest Service's 1982 Run Wild data base (on file at the Rio Puerco Resource Area) lists 131 vertebrate species possibly found in the grama-galleta vegetative type in Sandoval County. This list includes 7 species of amphibians, 65 of birds, 50 of mammals, and 19 of reptiles. In the juniper-pinyon ecotype in Sandoval County, 137 vertebrate species including 3 species of amphibians, 65 of birds, 50 of mammals, and 19 of reptiles possibly occur.

A number of bluffs and mesa edges in the WSA provide excellent nesting habitat for raptors (birds of prey), swallows, and swifts. Several stock ponds are present to provide resting areas for migrating waterfowl. Scaled quail and mourning doves inhabit the brushy draws and rocky wooded hillsides. A few mule deer occupy the juniper-pinyon ecotype, and a small band of antelope range into the northwest corner of the WSA. Other wildlife common to the WSA include coyote, fox, rabbit, horned lark, raven, and kestrel.

TABLE E-3  
VEGETATION, QUITO WSA

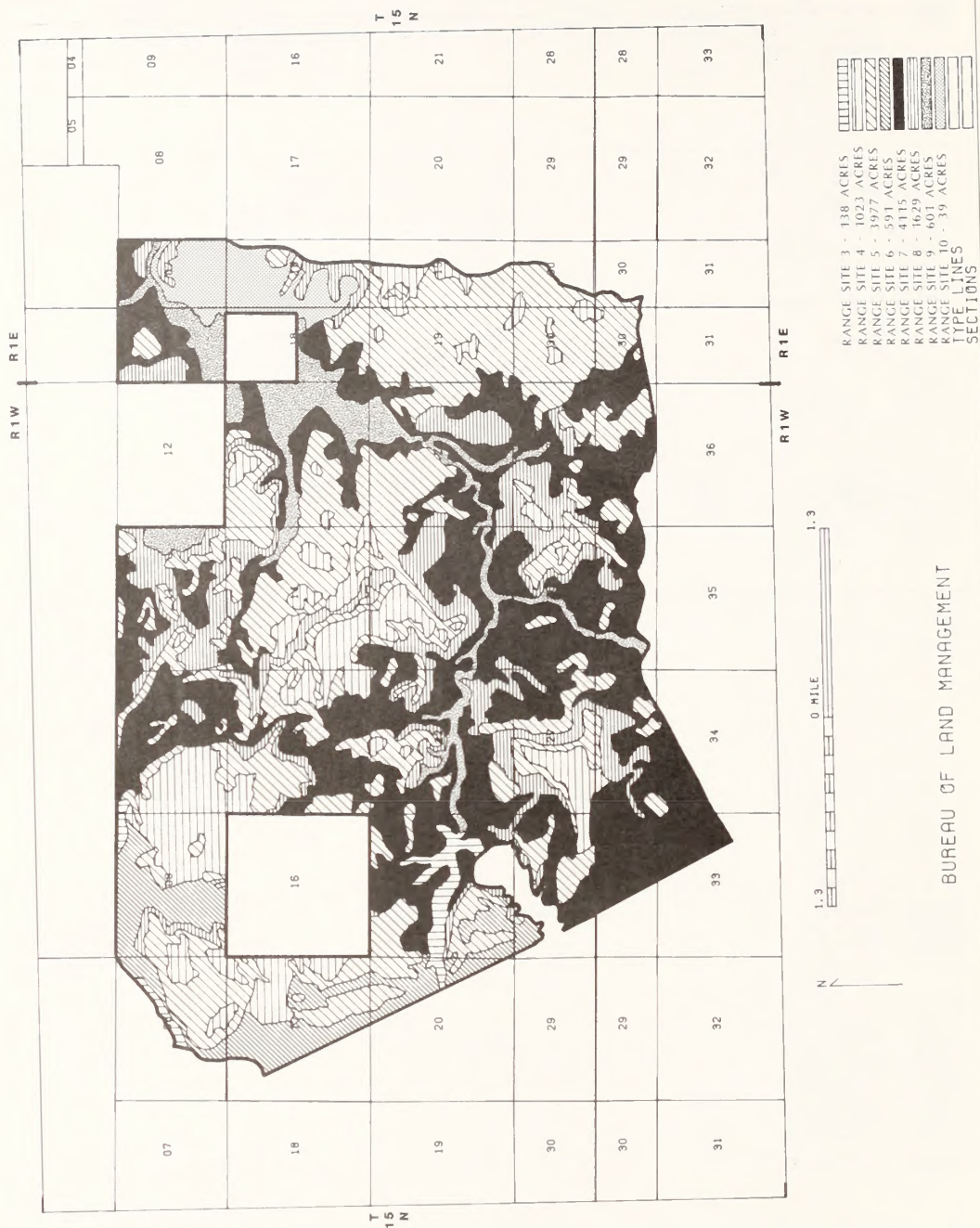
Range Site Number	Ecotype	Slope Percent	Aspect	Vegetative Cover (Percent)	Carrying Capacity Acres/AUM	Range Condition	Present Vegetation Species	Potential Perennial Plant Density (%)	Production (lbs/ac)	Potential Vegetation Species	Related Soil Type
1	Grama-galleta steppe	3	N, E, S	20	8.51	Fair-good	Galleta grass, shadscale, alkali sacaton	15	525	Sideoats grama, Indian rice-grass, black grama, NM feather-grass	060-Shingle Complex
2	Grama-galleta steppe	3	N, E	20	6.22	Fair	Galleta grass, broom snake-weed, blue grama	20	450	Blue grama, Indian rice-grass, bottlebrush squirrel-tail, four-wing salt-bush	070-Las Lucas Unnamed 07B Association
3	Grama-galleta steppe	1	E, S and nearly flat	36	5.77	Poor-good	Fourwing salt-bush, alkali sacaton, galleta grass	20	2,500	Alkali sacaton, blue grama, galleta grass, four-wing salt-bush	080-Billings Variant Silty Clay Loam
4	Grama-galleta steppe	3	N, S, W	19	5.85	Fair	Galleta grass, broom snake-weed, yellow-flowered pricklypear	20	450	Black grama, blue grama, galleta grass, Indian rice-grass	140-Penistaja Bond Association
5	Juniper-pinyon woodland	4	N, S, W and nearly flat	30	10.27	Fair	One-seed juniper, galleta grass, alkali sacaton	24	500	Sideoats grama, blue grama, little blue-stem, NM feathergrass	111-Rock Outcrop Orthents Complex
6	Grama-galleta steppe	3	N and S	17	7.02	Fair	Galleta grass, broom snake-weed, winterfat	15	475	Sideoats grama, Indian rice-grass, NM feather-grass, galleta grass, Bigelow sage	011-Trave-silla-Shingle-Eroded Rock Outcrop Complex
7	Grama-galleta steppe	3	N, E, S and nearly flat	19	6.59	Fair	Galleta grass, broom snake-weed, alkali sacaton	20	475	Sideoats grama, blue grama, black grama, galleta grass	111-Rock Outcrop Orthents Complex
8	Juniper-pinyon woodland	22	N, S and nearly flat	21	31.26	Poor	One-seed juniper, shadscale, black grama	20	80	Indian rice-grass, blue grama, true mountain mahogany, cliffrose, shrub live oak	010-Trave-silla-Shingle-Rock Outcrop Complex



TABLE E-3 (concluded)

Range Site Number	Ecotype	Slope Percent	Aspect	Vegetative Cover (Percent)	Carrying Capacity Acres/AUM	Range Condition	Present Vegetation Species	Potential Perennial Plant Density (%)	Production (lbs/ac)	Potential Vegetation Species	Related Soil Type
9	Grama-galleta steppe	less than 1	N, E, S and nearly flat	21	4.68	Fair	Fourwing salt-bush, alkali sacaton, blue grama	45	2,500	Vine mesquite, alkali sacaton, blue grama, fourwing saltbush	170-Kim Loam
10	Juniper-pinyon woodland	18	N, S, W	16	25.45	Poor	One-seed juniper, galleta grass, alkali sacaton	20	80	Indian rice-grass, blue grama, true mountain mahogany, cliffrose, shrub live oak	110-Rock Outcrop-Gypsum Land Complex
11	Grama-galleta steppe	2	N	13	17.50	Poor-fair	Alkali sacaton, sand dropseed, fourwing salt-bush	15	475	Indian rice-grass, blue grama, sand dropseed, spike dropseed, fourwing salt-bush	120-Sheppard Variant Loamy Sand
12	Grama-galleta steppe	1	N and nearly flat	24	11.09	Fair	Shadscale, fourwing salt-bush, alkali sacaton	15	525	Alkali sacaton, blue grama, galleta grass, fourwing salt-bush	130-Sheppard Variant-Unnamed 13 Association

# VEGETATION, OJITO WSA



MAP E-3



## VISUAL RESOURCES

The Ojito WSA provides a variety of scenic values that are presently being managed under an interim Visual Resource Management (VRM) Class II while the WSA is under wilderness review. Enclosures 1 and 2 of this appendix provide a description of the VRM Classes and their management objectives.

The eastern portion of the Ojito WSA incorporates Querencia Arroyo, which meanders from north to south and is bounded by a steep-sided canyon. High rocky bluffs beyond the canyon to the east and west frame distant views of Cabezon Peak, Mesa Prieta, and the Sandia Mountain Range. Red-toned bluffs, pale limestone mesa edges, and dark green junipers contrast with the blue skies. Bands of shales, sandstones, and limestone highlight the canyon walls, distinct from the surrounding desert tans. Extending westward are rock terraces dissected by rocky canyons that climb to expansive plateaus and mesa tops.

Retreating escarpments that step back from the uplands are honeycombed with pockets of impressive scenic features. Some pockets contain sculptured badland formations of sandstone in many shapes and sizes. Other sheltered pockets contain residual ponderosa pine populations that are rare in this environment. Still other pockets reveal a variety of features including petrified wood and multi-colored rock layers.

## CULTURAL RESOURCES

Cultural resource inventory within the Ojito WSA is limited to coverage of one section (640 acres) out of a total of 11,919 acres, or about 5 percent. Several small BLM surveys and energy-related linear surveys have also been conducted. These suggest that well over 500 sites are located within WSA boundaries, and that the density would average in excess of 21 sites per section.

Most of the WSA's recorded sites (27 out of 43) are located within the single section surveyed. Of these sites, none are PaleoIndian. Reports of Folsom points and other PaleoIndian materials have occurred in the general WSA vicinity, but the location patterns and probability of occurrence of PaleoIndian sites remains unknown. One additional site (Ojito Dune Site), excavated in the late 1960's, contains both PaleoIndian and Archaic components.

Twelve Archaic sites are reported for the WSA, and range in nature from small lithic scatters to large scatters with ground stone, cists, ash, and fire-affected rock present. Known Archaic sites are located in sand dune areas on low mesa terraces. Existing survey data suggests relatively frequent and extensive use within this WSA by Archaic-period populations.

No Basketmaker sites are reported for this WSA. However, indications of sizeable Archaic and prehistoric pueblo occupations within the WSA (occurring before and after the Basketmaker period) suggest that some evidence of Basketmaker occupation also exists.

Eleven prehistoric pueblo sites are reported for the WSA, ranging from the Pueblo I time period through Pueblo IV (750 A.D.-1400 A.D.) (refer to

Table E-4). Pueblo sites in this general region tend to be located on mesa tops and mesa terraces; they range in nature from lithic/sherd scatters to small pueblos of 30 or more rooms.

Two Navajo sites are recorded within the Ojito WSA. Additional Navajo sites can be anticipated for this WSA, but far fewer in total numbers than sites from earlier time periods.

Historic use of the middle Rio Puerco drainage (and therefore the WSA) has been moderately extensive. Spanish settlers entered the valley before the 18th century, and remnants of an Hispanic population remain today. Seven historic sites are known within the WSA, of which six are habitational. One is a livestock corral. The recorded sites show a location preference for drainage bottoms and lower canyon slopes. Projected site densities for historic sites should be high for these locations within this WSA.

TABLE E-4

ARCHAEOLOGICAL SEQUENCE FOR THE RIO PUERCO RESOURCE AREA  
(After Dittert, 1959)

Cultural Period	Time	Cultural Period	Time
PaleoIndian	Before 250 B.C.	Pueblo II	870-950 A.D.
Archaic	Before 250 B.C.- 700 A.D.	Pueblo II	950-1100 A.D.
	(500-700 BMII)	Pueblo III	1100-1200 A.D.
Basketmaker	700 A.D.	Pueblo III-IV	1200-1400 A.D.
	800 A.D.	Pueblo IV	1400-1600 A.D.
Pueblo I	800-870 A.D.	Pueblo V	1600-Recent

#### AIR QUALITY

Ambient air quality monitoring data for the general area of the Ojito WSA was collected during 1975-76 by the State of New Mexico Environmental Improvement Agency, Air Quality Division. Readings were all within the Class II standards established by the Clean Air Act (as amended, 1977) for BLM-administered lands.



## SECTION 3

## EXISTING AND POTENTIAL USES

## MINERAL DEVELOPMENT

No exploration or development activity associated with locatable, leasable, or salable minerals is occurring within the boundaries of the Ojito WSA. No recordation of mining claims has been made. Although 14 oil and gas leases have been issued, no producing wells have been completed and the level of exploration activity has been low.

Table E-1 (Section 2) indicates that the highest potential for development is associated with uranium in the Morrison Formation, gypsum in the Todilto Formation, sand, gravel, and petrified wood. The geologic environment, inferred geologic processes, reported mineral occurrences, and known mines or deposits indicate a high favorability for the accumulation of these mineral resources. Even though the favorability is high, the absence of mining claims argues for only a moderate potential for development.

The development of sand, gravel, and petrified wood is also questionable because these salable resources are widespread and more readily accessible in other areas. All of the other listed commodities have only a low to moderate potential for development.

## WATERSHED

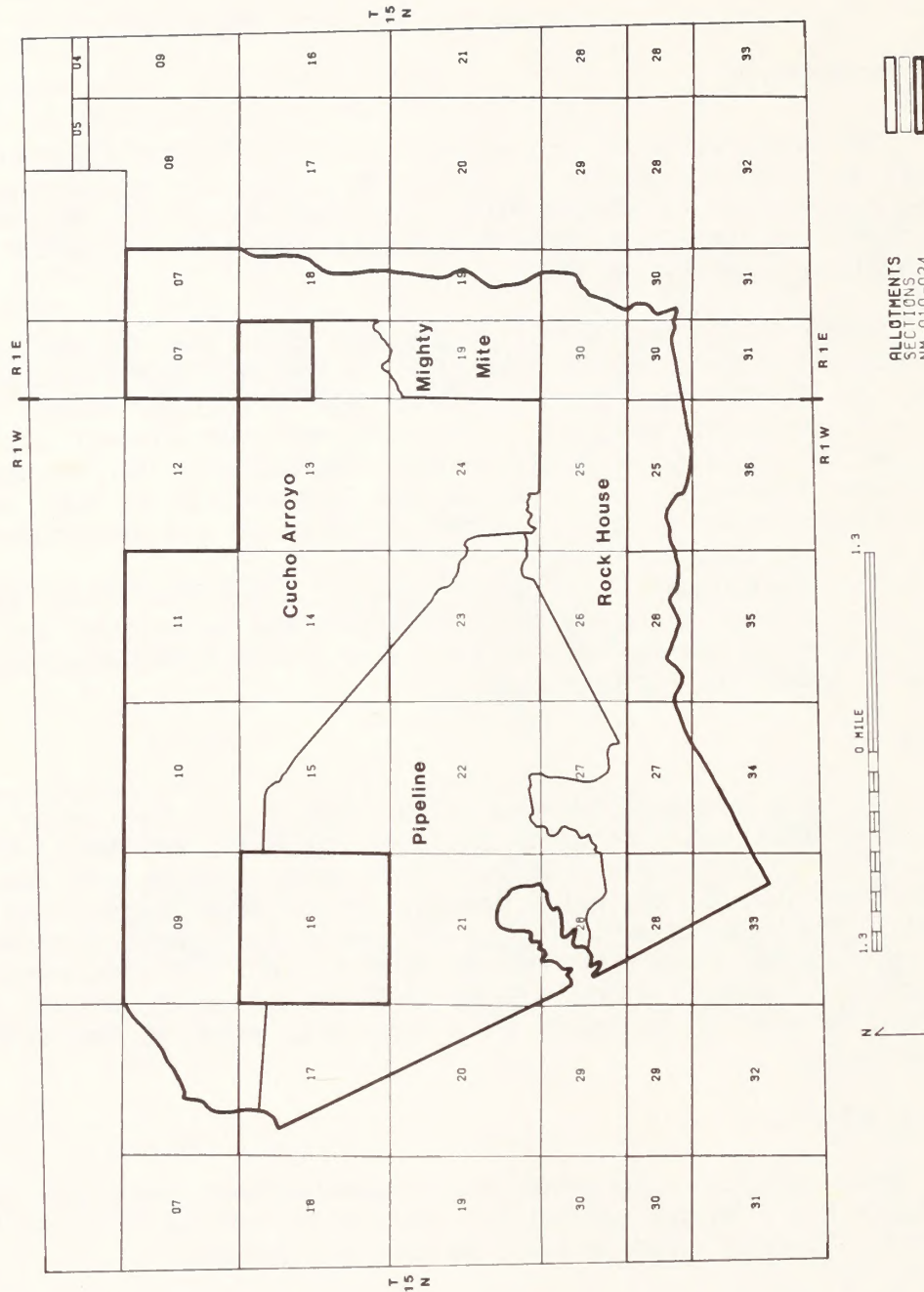
The main drainage bottoms of the WSA are in the latter stages of an erosion cycle that was apparently initiated by sheep and cattle overgrazing in the late 1800's and early 1900's. This past grazing use has resulted in extensive sheet, rill, and gully erosion in all areas except the steep slopes of mesas. The WSA is especially vulnerable to upland erosion because of sparse vegetation, relatively steep slopes, and the occurrence of violent thunderstorms. Leopold (1966) found that upland sheet erosion was the most significant source of sediment in a semi-arid area of New Mexico during a 6-year period.

## LIVESTOCK GRAZING

Four grazing allotments are located within this WSA (refer to Map E-4). Table E-5 displays grazing information pertaining to these four allotments. The WSA supports 1,207 Animal Unit Months.

Most of the operators grazing livestock in the WSA ranch as a second income or to continue family tradition; ranching is not their primary source of income. They live in the vicinity of Cuba and Albuquerque, near their primary sources of income. Therefore, most of them can attend to their grazing allotments only on weekends, and the pickup truck has become increasingly important as a livestock management tool.

# RANGE ALLOTMENTS, OJITO WSA



MAP E-4

BUREAU OF LAND MANAGEMENT



TABLE E-5  
RANGE ALLOTMENT INFORMATION

Allotment Name	Number	Total Acres	WSA Acres	Number of Permittees	Authorized Livestock Numbers	Season of Use
Mighty Mite	0058	1,099	987	1	21 head	6 months (12/1-5/31)
Cucho Arroyo	0057	6,429	4,379	2	110 head	6 months (12/1-5/31)
Pipeline	0056	13,611	3,126	1	107 head	Yearlong
Rock House	0060	14,712	2,427	2	106 head	Yearlong

#### All Allotments

No new range improvements are planned for any of these allotments.

#### FOREST PRODUCTS

Pinyon and juniper are the two major tree species that grow in the WSA. They are not commercially usable because of their generally low stand densities, and little potential exists for domestic firewood use. However, some limited illegal cutting for firewood continues to be a problem in the Ojito WSA, particularly along its eastern and southern boundary.

The WSA contains a few residual ponderosa pine trees located in several small "pockets". These are not considered commercially usable.

#### RECREATION

To describe the existing recreation environment, the BLM's Recreation Information System (RIS) utilizes a quality evaluation system that rates the quality of experience a visitor can expect while participating in a specific activity. The Ojito WSA has been divided into two RIS units and rated for the five activities shown in Table E-6.

TABLE E-6  
RECREATION QUALITY EVALUATION

Activity	Mineral Springs Unit	Bernalillo Arroyo Unit	Key Factors
ORV use	Medium	High	Soil, size, hazards, usability
Sightseeing (Scenery)	High	Low	Landform, color, water, vegetation, uniqueness, intrusions
Sightseeing (Geological)	High	-	Extent, representative type, form, color, frequency of occurrence
Big Game Hunting	Low	-	Game population, ease of movement, shooting opportunity
Primitive Values	High	-	Scenic qualities, size, intrusions, wildlife, fisheries, water, usability, uniqueness

Southwest Off-Road Enterprises of Albuquerque has sponsored the "Oh My God 100" motorcycle (motocross) race in and around the WSA seven times since 1975. Approximately half the course follows WSA boundary roads, and the remaining portions have run along existing trails and arroyo bottoms in the WSA. The Recreation Management Area (RMA) plan lists 708 visitor days and 850 visits for the area in FY 1981, most of which occurred on the day of the race (refer to Figure 2).

The WSA offers opportunities for scenic and geological sightseeing, rockhounding, horseback riding, photography, hiking, and camping. Random ORV use associated with hunting occurs in the WSA. A small group of artists, photographers, and nature enthusiasts have utilized the Ojito WSA consistently since the mid 1950's.

The WSA lies within New Mexico State Planning District 3. Recreation demand in this district is indicated in a study completed by the University of New Mexico's Bureau of Business and Economic Research (1975). Assessing non-developed recreation demand on a regional level is an indicator of the type of activities that an area like the WSA could support (refer to Table E-7).

#### EDUCATION/RESEARCH

The diversity of special features contained within the Ojito WSA, along with its close proximity to two of the largest population centers in New Mexico (Albuquerque and Santa Fe), make this WSA an ideal "natural laboratory".



FIGURE 2 NUMBER OF PARTICIPANTS PER RACE DATE  
 "OH MY GOD 100" MOTORCYCLE RACE  
 OJITO WSA

NUMBER OF  
 PARTICIPANTS

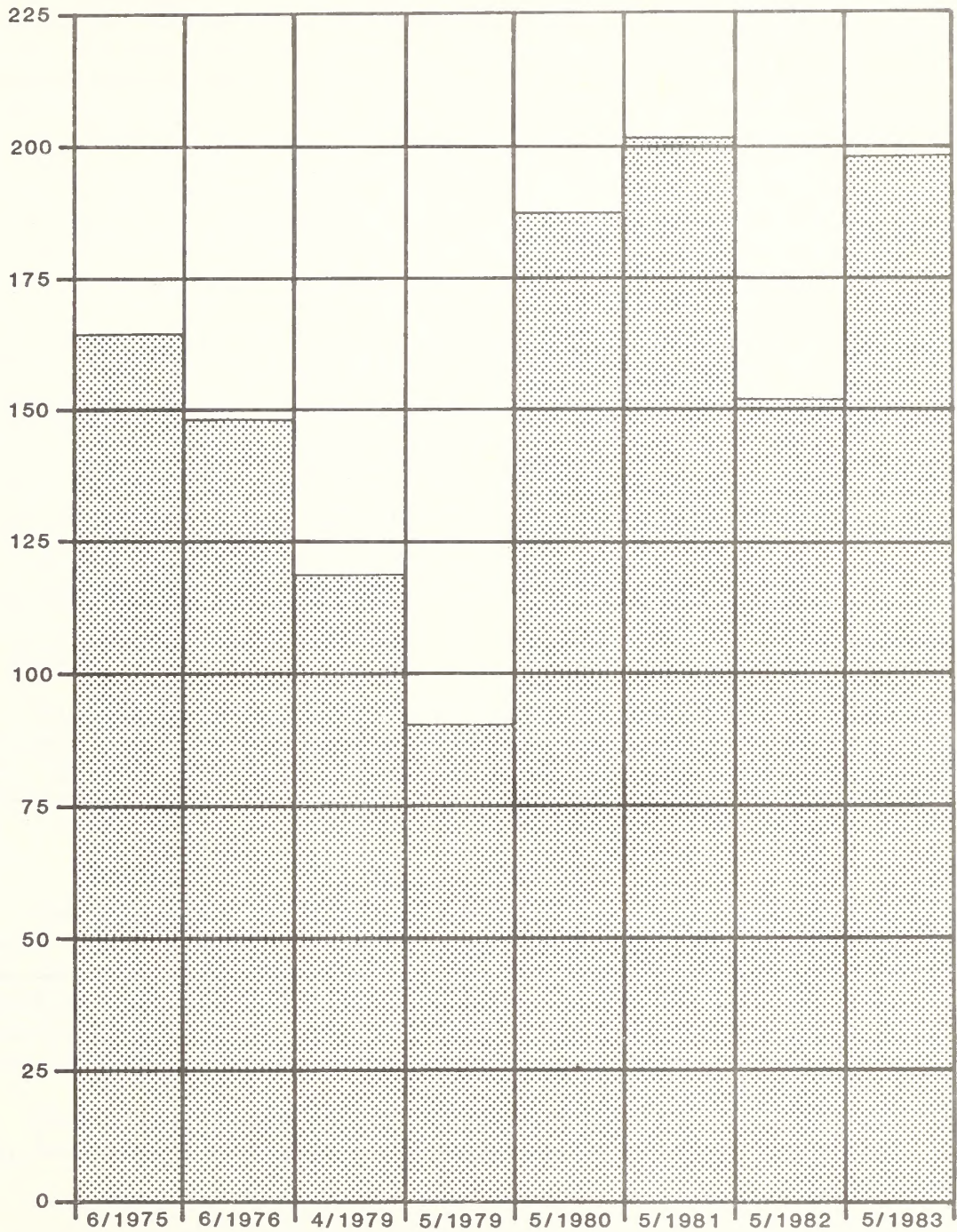


TABLE E-7

RECREATION DEMAND, OJITO WSA  
(based on visitor-use days)

Activity and Projected Use Figures	1975	1980	1985	1990
Pleasure walking	7,487,332	8,448,000	9,209,000	10,002,000
Jogging	4,256,140	4,802,000	5,235,000	5,686,000
Park visits	1,945,664	2,190,000	2,388,000	2,593,000
Birdwatching	1,394,103	1,573,000	1,714,000	1,862,000
Horseback riding	1,249,915	1,410,000	1,538,000	1,669,000
Photography/Painting	1,051,006	1,186,000	1,293,000	1,404,000
Sightseeing	925,059	1,043,000	1,138,000	1,236,000
Picnicking	786,083	887,000	967,000	1,050,000
Hiking	427,351	482,000	526,000	571,000
Rock hounding	424,745	479,000	522,000	567,000
Visiting historical sites	422,573	477,000	520,000	564,000
Camping	394,444	445,000	485,000	527,000
Small game hunting	247,551	279,000	304,000	331,000
Backpacking	111,180	125,000	137,000	148,000
Big game hunting	98,151	111,000	121,000	131,000



Special features include wildlife, historic, prehistoric, paleontologic, geologic and scenic elements, as well as threatened and endangered vegetation. All of these values are available for study in a natural setting and lend themselves to interpretation for any age or development level. The WSA presently serves one Albuquerque High School class as an on-site laboratory for its semester study of environmental issues.

#### NATIVE AMERICAN USES

Native Americans (particularly nearby Navajo, Jemez, Zia, and Santa Ana peoples) have traditionally used the Ojito WSA for firewood gathering and hunting. Some use continues presently. The Jemez Snake Catching Clan has traditionally collected snakes in the WSA, but it is not known if this use continues.

Recent survey near the WSA and interviews with officials of the Jemez, Zia, and Santa Ana Pueblos, and the Canyoncito Navajo Reservation generally show that many places of religious significance exist in and near the Ojito WSA. Specific site locations are not known to the lay members of the tribes because only tribal elders know of and watch over such sites. Apparently it would be indiscreet for the secular governments to propose a survey or to provide any information of such an esoteric nature.

Traditional uses within the boundaries of this WSA by Native American populations are expected to continue.

#### REALTY ACTIONS

The western boundary of the Ojito WSA lies within a proposed 500-kV transmission line corridor that would serve the proposed New Mexico Generating Station. However, present information indicates that this transmission line could be accommodated entirely outside of the present boundaries of the WSA.

#### WILDLIFE

The Ojito WSA is included in the upper Rio Puerco Wildlife Habitat Management Plan. Several wildlife water units (associated with the proposed Cabezón pipeline construction) with exclosure fences are planned for construction, and some of the existing stock tanks are scheduled for development for waterfowl use. This would include cleaning and sealing of the tanks and protective fencing of shoreline vegetation.

Human use of the wildlife resource in the WSA includes predator calling, trapping, bird hunting, and observation incidental to hiking.





## SECTION 4

## WILDERNESS CRITERIA

## EVALUATION OF WILDERNESS VALUES

Quality of Mandatory Wilderness Characteristics

## Naturalness

A detailed description of the imprints of man's work in the Ojito WSA is documented in the Wilderness Intensive Inventory (USDI, BLM 1980). In summary, this WSA includes a fenceline network, 11 earthen dams, 9 two-track ways, evidence of illegal woodcutting, and scattered litter. It is important to note that the BLM considers the cumulative effect of these imprints upon the entire WSA when assessing naturalness, which is a function of the size of the unit and the number and distribution of the impacts.

The dams are widely scattered throughout the WSA and are well-buffered by the surrounding topographic relief and vegetative screening. Several are silted in. Ways are maintained solely by vehicular travel and would return to a natural condition if use were discontinued. Several ways along the east boundary have returned to an almost-natural condition since initial inventory. Evidence of illegal woodcutting and litter are visible in the southeastern portion of the WSA, concentrated along a two-track route.

As a whole, the WSA has been affected primarily by the forces of nature, and thus is assessed as exhibiting the wilderness characteristic of naturalness. Considering the Ojito WSA's close proximity to the populations of Albuquerque and Santa Fe, its natural condition is particularly outstanding.

## Solitude

The BLM considers solitude as the state of being alone, removed from habitation, or in isolation. One may experience solitude in the Ojito WSA by wandering through the numerous steep-sided canyons, sandy arroyos, and rough, rocky terrain found throughout. This rugged topographic screening enhances opportunities for solitude by protecting users from the sights and sounds of others. The Ojito WSA possesses ample outstanding opportunities for a person to experience solitude.

## Opportunities for Primitive and Unconfined Recreation

The BLM considers primitive and unconfined recreation as the potential a WSA has to provide opportunities for a diversity of possible activities, or one activity of outstanding quality. The Ojito WSA contains the opportunity for a wide diversity of outstanding primitive recreation activities.

The varied landscape provides outstanding photographic and sightseeing potential. Highlights include large-mouth canyons, wide-cut arroyos, colorful rocky bluffs, flat highlands, and a viewscape of distant mountain ranges including the Sandias. Sightseeing opportunities also exist

associated with the historic and prehistoric sites that occur in abundance. Hikers, campers, backpackers, and rockhounds are accommodated by the variety of terrain offered throughout the WSA. Opportunities for good bird hunting exist in Ojito.

### Special Features

Overall, the Ojito WSA has a particularly high density and wide variety of special features. Although wildlife is not abundant, a diversity of species is present. Two plant species occur in the WSA that are on the New Mexico State Heritage list of species of concern.

The first species is Bigelow verbena-wildflower (Abronia bigelvoii), considered by W. C. Martin to be an endangered taxa in New Mexico. The second, blue grama cactus (Pediocactus papyracanthus), is found just to the north and east of the eastern part of the WSA. This cactus is found growing in clumps of blue grama and black grama in swales, and is a candidate for formal listing by the federal government as threatened. Others include moonpod-wildflower (Selinocarpus lanceolatus), and fleabane-wildflower (Erigeron pulcherrimus).

The cultural resource density within this WSA is particularly high, and includes Archaic, prehistoric, and historic sites (refer to Figures 3 and 4). Paleontological sites have also been found, but their full significance has not been determined as yet because excavation has not occurred. Further study is taking place. The diversity in terrain provides varied and striking visual features (refer to Figures 5 and 6).

Combined, the special features in the Ojito WSA provide exceptional scientific/educational potential.

### Multiple Resource Benefits

The Ojito WSA contains a wealth of natural values as a result of its relatively undisturbed character. Congressional designation as wilderness would carry the weight of law and would provide a greater degree of long-term protection for these natural values than would the administrative designations available to the BLM.

A more detailed discussion of multiple resource benefits for the Ojito WSA may be found under the discussion of the impacts of the All Wilderness Alternative (Section 6 of the appendix).

### Diversity in the National Wilderness Preservation System

#### Ecotypes

The Ojito WSA, according to Robert G. Bailey (USDA, FS 1980) falls under the Dry Domain in the Highland Province and the Colorado Plateau Sub-Province. This sub-province can be further subdivided into the Grama-Galleta Steppe and Juniper-Pinyon Woodland Mosaic.

The two A. W. Kuchler ecotypes (1964) found in the WSA are described as follows:





Figures 3 and 4 - The Ojito WSA contains numerous sites of archeological significance.





Figure 5 - The scenic formations throughout the Ojito WSA owe their existence to the ancient sculptors, wind and rain.



Figure 6 - Natural ponderosa pine (very uncommon at the elevation of 6,000 feet) grows in pockets in the Ojito WSA. The trees intermingle with sculptured sandstone formations set in a very rugged landscape.



Grass-Galleta Steppe. Total acres in the WSA are approximately 5,655 ( 48 percent of the WSA).

Juniper-Pinyon Woodland. Total acres in the WSA are approximately 6,264 (52 percent of the WSA).

Map E-5 displays these ecotypes. Vegetation Map E-3 (Section 2), breaks each ecotype into more refined site categories that are narrated in Table E-3 (Vegetation--also located in Section 2 of this appendix).

#### Distance from Major Population Centers

The Ojito WSA is within a one day drive (5 hours) of Bernalillo County and part of Sandoval County, which have been identified in the 1980 census as a Standard Metropolitan Statistical Area. The WSA is within a 2-hour drive from the cities of Albuquerque or Santa Fe, two of the largest population centers in New Mexico.

#### MANAGEABILITY

To be recommended as suitable, the Ojito WSA must be capable of being effectively managed as wilderness. To determine manageability, the BLM must consider such factors as state and private inholdings, valid existing rights, mineral leases, rights-of-way, topography, and the overall land status pattern.

Reasonable access must also be guaranteed to state and private inholdings. These access needs would result in the occurrence of generally low levels of use incompatible with wilderness.

Manageability could be enhanced by removing approximately 1-1/4 sections located in the northeast portion of the WSA (refer to Map E-1). This acreage is surrounded on three sides by non-federal land and is contiguous on the south with a quarter section of private land. Access to the private inholding crosses this northeastern parcel. Redefining the WSA boundary (Map E-1) would eliminate the quarter-section of private inholding and the associated need to cross the Ojito WSA to gain access to it.

Manageability could be further enhanced if the acquisition of state-owned Section 16 (T. 15 N., R. 1 W.) were accomplished. This section exhibits wilderness values similar to the Ojito WSA, and is used predominantly for grazing.

# ECOTYPES, OJITO WSA



BUREAU OF LAND MANAGEMENT

MAP E-5



## SECTION 5

## PUBLIC INVOLVEMENT OVERVIEW

This report has been prepared with public input obtained by large mailings, public meetings, open houses, and personal contacts. These efforts began during the wilderness inventory phase and will continue during the preparation of the statewide wilderness EIS.

Considerable interest in the the management status of the Ojito WSA has been expressed by the public. The WSA's close proximity to the cities of Albuquerque and Santa Fe and the resultant ease of access for such a large percentage of New Mexico's population has been pointed out. The Ojito WSA's wide variety of special features, natural character, and opportunities for solitude and primitive and unconfined recreation were also noted.

Opponents of wilderness designation for the Ojito WSA discussed the effect of excluding it from possible future mineral exploration and development, the presence of human impacts, and possible limitations on ranch operations. (Refer to the public response summary for the wilderness intensive inventory, located in Enclosure 3 of this appendix).

During the public comment period on the Albuquerque District Wilderness Study Draft EA (USDI, BLM 1983), public inputs were received on the Ojito WSA. Three inputs expressed opposition to wilderness designation. They cited high favorability for uranium, and moderate potential for oil, copper, silver, molybdenum and gold. One commentor felt the Ojito WSA contained too many man-made intrusions, while another expressed the opinion that the Ojito WSA's special values could be managed effectively without wilderness designation.

The majority of the inputs, 23 personal letters, favored wilderness designation. The availability of quality wilderness characteristics (particularly solitude and special features) so close to Albuquerque was repeatedly emphasized. The Ojito WSA's value for its "stark beauty" and sanctuary for raptors was mentioned. One input from a geologist expressed the opinion that mineral development potential was minimal within the Ojito WSA, with similar opportunities existing throughout the region.

Miscellaneous comments included a statement that one individual had taken more than 100 people to the Ojito WSA, each of whom was prepared to "speak up" for the Ojito WSA. The State of New Mexico anticipated two conflicts and encouraged immediate discussion on a land exchange. The Ojito WSA was noted as a high priority with the New Mexico Wilderness Study Committee.





## SECTION 6

## ALTERNATIVES AND IMPACTS

This section discusses three alternatives for the Ojito WSA: All Wilderness, Amended Boundary, and No Action (manage under the existing plan).

ALL WILDERNESS ALTERNATIVE

Under the All Wilderness Alternative, the entire 11,919 acres of public land within the Ojito WSA would be recommended as suitable for wilderness designation.

Impacts on Wilderness

On any acreage designated as wilderness, the existing and potential uses would be regulated by the BLM's Wilderness Management Policy (1981). Wilderness values would be retained and protected over the long term by management under this policy. Under the All Wilderness Alternative, the added protection of Congressional designation would significantly benefit the wilderness resources in the Ojito WSA.

Impacts on Minerals

Wilderness designation would eliminate, except for valid existing rights, the potential for development of all locatable and leasable minerals that may occur within the WSA. Although a moderate favorability exists for the occurrence of copper, silver, molybdenum, gold, uranium, thorium, gypsum, bituminous rock, sand, gravel, clay, humates and petrified wood, wilderness designation could curtail exploration and prevent possible future extraction. However, under present economic conditions, little demand exists for the extraction of copper, silver, uranium, thorium, bituminous rock, molybdenum, gold, or clay from the Ojito WSA's reserves.

Although gypsum, sand, gravel, and humates occur throughout northern New Mexico, any of these resources located in the Ojito WSA would be considered economically attractive regionally because extraction near the source of utilization is essential to achieving an acceptable profit margin.

Designating the Ojito WSA as wilderness would withdraw it from appropriation under the mining laws and from leasing under the mineral leasing laws, subject to valid existing rights at the time of designation. Due to the moderate favorability for the occurrence of locatable minerals in the Ojito WSA, this alternative could have a significant impact to mineral development over the long term.

Impacts to Other Resources and Uses

This alternative would not have significant impacts on air quality and realty actions in the Ojito WSA. For this reason, they are not included in the following discussion.

### Soils, Watershed, Vegetation

Restrictions on surface-disturbing and mechanized activities would provide long-term protection for the existing soils, watershed, and vegetation, including threatened and endangered plant species. It is therefore anticipated that no significant impact would occur to these resources under this alternative.

### Wildlife

Restrictions on surface-disturbing activities and mechanized activities could help provide protection for wildlife habitat. Reduced vehicle access should reduce both legal and illegal furbearer harvest. Restraints on construction of fence exclosures could occur. Overall, no significant impacts would occur to wildlife in the Ojito WSA under the All Wilderness Alternative.

### Visual Resources

Existing visual resources would be protected under VRM Class I management. No significant impacts are expected as the result of restricting visual modification by management activities to minimal levels.

### Cultural Resources

Site-condition monitoring associated with surveillance could prove beneficial because over 80 percent of the Rio Puerco Resource Area's known sites suffer from significant natural deterioration. It is assumed that increased monitoring would take place under wilderness designation. This would increase the ability to detect, and if warranted, to arrest serious deterioration at relatively early stages.

The wilderness management policy allows the natural decay of sites. Excavation and stabilization may be permitted on a case-by-case basis where the State Director determines that the project would not degrade the overall wilderness character and when such activity is needed to preserve the particular cultural resource.

Limited surface-disturbing activities would be allowed under wilderness designation. This could limit the destruction of the Ojito WSA's abundant cultural sites through other than natural causes. Overall, wilderness designation would have little impact on cultural resources.

### Livestock Grazing

Livestock operations in the Ojito WSA would be affected by wilderness designation. These effects may result from limitations imposed on the maintenance of existing range improvements and the construction of some proposed improvements (refer to Section 3 of this appendix). Although grazing is a permissible and compatible activity under wilderness designation, limitations on vehicular access, type of construction materials, and location of new improvements may occur in order to protect wilderness characteristics.



A major impact to allottees holding permits in the Ojito WSA could occur because of limitations on the use of motorized vehicles in designated wilderness areas. Wilderness designation would hinder the effective use of already limited time to tend to weekend ranching operations. No significant impacts to livestock grazing would occur.

The pipeline system proposed in the AMPs to be placed within the Ojito WSA will not be constructed, thereby eliminating any potential significant impact by wilderness designation on range improvement development. The BLM Final Range Improvement Policy (dated October 15, 1982) eliminated the pipeline construction base funding.

#### Forest Products

It is assumed that increased management attention (such as regular patrol) would occur under wilderness designation and could curtail illegal woodcutting. Impacts on forest products would not be significant under this alternative, because the major tree species in the WSA are not commercially usable.

#### Recreation

Recreation activities that require motorized vehicles would be significantly impacted, including some hunting and motocross activity. These are both popular activities presently occurring within the Ojito WSA. The Ojito WSA is often the site of the annual "Oh My God 100" motocross race. This option would be eliminated.

Wilderness designation would ensure that the present opportunities for primitive and unconfined recreation would be available to meet high regional demands. (Refer to Section 3 of this appendix.) Although these opportunities do exist outside of the WSA, Ojito provides the natural setting upon which the outstanding recreation quality is dependent.

Overall, wilderness designation would significantly enhance regional recreation opportunity, despite the loss of the motocross option.

#### Education/Research

Wilderness designation would ensure the preservation of the existing "natural laboratory" in the Ojito WSA. The natural setting that provides the opportunity for education and research would benefit significantly from the added protection provided by the All Wilderness Alternative.

#### Native American Uses

Limitation of vehicular access could hinder Native American uses. However, the preservation of solitude and naturalness could enhance the use of the WSA for religious purposes, because they are often dependent on specific natural settings. The impact this alternative would have on Native American uses of the Ojito WSA is unquantifiable.

## AMENDED BOUNDARY ALTERNATIVE

Under this alternative, 11,297 acres of public land within the Ojito WSA would be recommended for wilderness designation (refer to Map E-1). The amended boundary would exclude 622 acres of public land in the northeast portion of the WSA for manageability reasons.

Impacts on Wilderness

If the area within the amended boundary is designated wilderness, all existing and potential uses would be managed under the BLM's Wilderness Management Policy (1981). The small reduction in acreage would not significantly impact existing wilderness values. In addition, this modification would enhance the overall manageability of the wilderness resource.

Impacts on Minerals

Impact on minerals would be the same as stated in the All Wilderness Alternative except for 622 acres in the northeast corner of the WSA, which would be available for mineral development.

Impacts on Other Resources and Uses

Impacts to other resources would remain the same as stated in the All Wilderness Alternative for the 11,277 acres remaining within the wilderness boundary. On the 622 acres deleted from wilderness consideration, non-wilderness activities could resume.

## NO ACTION ALTERNATIVE

In the Draft Environmental Assessment, the Wilderness Analysis Report for this WSA (Appendix D) included three alternatives: All Wilderness, Amended Boundary, and No Action. Since the Draft's publication in March 1983, a comprehensive land use planning effort has been initiated in the Resource Area. This effort is called a Resource Management Plan (RMP). Tentative alternatives in the RMP currently include possible special designation for all or part of this WSA. As a result, the scope of the No Action Alternative for this WSA has changed.

Until Congress makes its decision on wilderness designation, the WSA will be managed under the Final Interim Management Guidelines for Lands Under Wilderness Review (USDI, BLM 1983). If Congress designates it as wilderness, the WSA will be managed under the Wilderness Management Policy (USDI, BLM 1981).

If the WSA is not designated as wilderness, it will be managed under the No Action Alternative, which would involve management under other than wilderness policy. Management would follow the guidelines of the Rio Puerco RMP.



The RMP is expected to be approved in late 1985 while the wilderness study process is still underway. Therefore, the RMP decision concerning this WSA may be incorporated into the Wilderness Study Report to be written later in this process. The tentative RMP proposal for the Ojito WSA currently emphasizes management of the scientific, educational, and interpretive potential of the following values: threatened and endangered plant species, cultural resources, paleontological sites, wildlife, visual resources, and semi-primitive non-motorized recreation.

If the approved RMP does not include special designation for any portion of the Ojito WSA, the WSA would be managed under the No Action Alternative according to multiple use concepts without stressing the values listed above. The most probable uses of the Ojito WSA would be livestock grazing, mineral exploration, and ORV use. Management actions calling for varying degrees of vegetation manipulation, water pipeline development, and rangeland improvements have been identified by the wildlife and range programs.

#### Impacts on Wilderness

The Ojito WSA's wilderness values would be subject to increased pressure for mineral exploration and development. Expected mineral exploration and development, increased ORV activity, and greater use of motorized vehicles could result in disruption of wildlife habitat, scenery, and vegetation as well as reduce the opportunity to experience solitude or primitive and unconfined recreation. Over time, all of these uses could be expected to significantly impact naturalness. The fragile resources of the WSA would be particularly vulnerable to development-oriented management.

To date no protective designation has been proposed for the Ojito WSA. The cumulative effect of this lack of a protective designation and non-wilderness management practices would be to degrade or eliminate the Ojito WSA's wilderness characteristics. Under this alternative, the impacts to wilderness values could be significant over the long term because protective management of the WSA would not be ensured through Congressional designation.

#### Impacts on Other Resources and Uses

The No Action Alternative would not have significant impacts on forest products, air quality, realty actions, livestock grazing, or minerals. For this reason, these resources are not discussed below.

##### Soils, Watershed, Vegetation

Continued vehicular access and other surface-disturbing activities could result in the potential for reduced watershed quality. These surface-disturbing activities would also affect soils and vegetation. The cumulative impacts of potential mineral development and vegetation manipulation projects could have significant impacts on soils, water, and vegetation.

##### Wildlife

Non-wilderness management could result in an increase in human activity and thus impact those wildlife species dependent on a predominately

unmodified ecosystem. However, a wider range of habitat management actions could occur under this alternative and in the long run, produce a more diverse habitat for wildlife. Overall, the impacts to wildlife under this alternative could be significant because of the extensive ecosystem modification that may be caused by surface-disturbing activities.

#### Cultural Resources

Continued vehicular access would allow the potential for vandalism, but would also provide for more frequent vehicular patrol and monitoring. Cultural resources would be vulnerable to surface-disturbing activities. These impacts could be mitigated by a wide variety of management options other than wilderness, such as withdrawals and closures, as well as specific site or area cultural resource management plans. Overall, the No Action Alternative would have little impact on cultural resources.

#### Recreation

Opportunities for primitive recreation could be reduced through potential surface-disturbing activities, including mineral development. Primitive and unconfined recreation relies on the resource base of a predominantly natural environment, which may not exist under non-wilderness oriented management.

The Ojito WSA is one of the areas closest to Albuquerque and Santa Fe that provides a primitive recreation experience with such a high diversity of recreation opportunity. This extremely popular primitive recreation opportunity could be significantly impacted under the No Action Alternative.

Recreation relying on vehicular travel as well as motocross use could continue, including the annual "Oh My God 100" motocross race. However, other motocross sites are available and also being used by the "Oh My God 100" constituency.

#### Education/Research

The natural setting supporting the special features of wildlife and two plant species on the New Mexico State Heritage list would be subject to surface disturbance and vehicular travel. This alternative could significantly degrade the Ojito WSA's potential for use as a "natural laboratory".

#### Native American Uses

The natural settings on which Native American uses are often dependent would be subject to surface-disturbing activities. The impacts to Native American uses of this WSA are unquantifiable.



## ENCLOSURE 1

### CRITERIA FOR VISUAL RESOURCE MANAGEMENT CLASSES

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- Class I - Applies only to classified special areas, e.g., roadless, wilderness, primitive, natural areas, etc. This quality standard is established through legislation or policy. Only natural ecological changes are allowed.
- Class II - Landscapes with Class A scenery quality, or Class B scenery quality in the foreground/middleground zone with high visual sensitivity. Changes in any of the basic elements (form, line, color or texture) caused by a management activity should not be evident in the characteristic landscape.
- Class III - Landscapes with Class B scenery quality and high visual sensitivity in the background visual zone, or with Class B scenery quality and medium visual sensitivity in the foreground/middleground visual zone or with Class C scenery of high visual sensitivity in the foreground/middleground zone. Changes in the basic elements (form, line, color, texture) caused by management activity may be evident in the characteristic landscape. However, the changes should remain subordinate to the visual strength of the existing character.
- Class IV - Landscapes with Class B scenery quality and high visual quality sensitivity in the seldom seen visual zone, or with Class B scenery quality and medium or low visual sensitivity in the background or seldom seen zones, or with Class C scenery quality (except with high sensitivity in the foreground/middleground zone). Changes may subordinate the original composition and character but must reflect what could be a natural occurrence within the characteristic landscape.
- Class V - Applies to areas identified in the scenery quality inventory where the quality class has been reduced because of unacceptable intrusions, or to areas that have the potential for enhancement. This classification indicates that change is needed. The class applies to areas where the naturalistic character has been disturbed to a point where rehabilitation is needed to bring it back into character with the surrounding countryside. It should be considered an interim short-term classification until one of the other objectives can be reached through rehabilitation or enhancement. The desired visual quality objectives should be identified.
- 

Source: After BLM Manual 6310 (U. S. Department of the Interior, Bureau of Land Management, 1975).

## ENCLOSURE 2

### VRM CLASS RATINGS

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"The purpose of a Visual Resource Management (VRM) Class is to reduce the visual impacts of developed activities and to manage the quality of the visual environment."

VRM classes are determined by combining the ratings from scenic quality classes, visual sensitivity levels, and distance zones. Scenic quality classes are rated for landform, water, color, vegetation, intrusions and uniqueness. These elements are combined and the area is quantified as one of the following classes:

Class A - Unique, outstanding features

Class B - Outstanding features common to the physiographic region

Class C - Features common to the physiographic region

Sensitivity levels are determined by frequency of travel through an area, use of area, and public knowledge of the area. These elements are rated and assigned a high, medium or low sensitivity level.

Distance zones are placed in three categories: foreground/middleground zone, background zone, seldom seen zone. The foreground/middleground zone is closer to the view and requires more attention and consideration in management decisions because of the great detail that can be seen in the landscape. The background and seldom seen zones are less detailed to the viewer and most impacts blend with the landscape because of the distance viewed from.

Ratings from scenic quality classes, visual sensitivity levels and distance zones are combined to form VRM classes. The VRM class identifies the suggested degrees of human modification that should be allowed in a certain landscape. See Enclosure 1 for definitions of each VRM class.

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## ENCLOSURE 3

## PUBLIC RESPONSE SUMMARY--OJITO WSA (NM-010-24)

FAVOR <u>Wilderness Study<sup>a/</sup></u>			OPPOSE <u>Wilderness Designation or Wilderness Study Status</u>		
I	S		I	S	
29	28		4	9	
I	S	<u>Supporting Reasons</u>	I	S	<u>Supporting Reasons</u>
1	1	Meets Size Criterion	3	8	Does Not Appear to be Natural
1	1	Over 5,000 acres	1	1	Range Impacts
1	1	Sufficient Size to be Managed as Wilderness	1	1	Offers No Opportunities for Solitude
17	16	Meets Naturalness Criterion	1	1	Offers No Opportunities for Recreation
3	1	Insignificant Mining Impacts	1	1	No Supporting Reasons Offered
18	17	Offers Opportunities for Solitude			
15	14	Offers Opportunities for Recreation			
15	14	Supplemental Values			
9	7	Manageable as Wilderness			
9	9	No Supporting Reasons Offered			
I	S	<u>FORM LETTERS &amp; PETITIONS</u>	I	S	<u>FORM LETTERS &amp; PETITIONS</u>
2524	2569	Endorsements of Conservationist Proposal			
1	615	Petition Endorsing Conservationist Proposal			

SEQUENCE NUMBERS

C006 R014  
 C007 L022  
 C005 L012  
 C015 E007  
 C008 A003  
 L031 L021  
 L011 W033  
 W009 G025  
 M032 S035  
 F014 S026  
 R016 D010  
 R017 H025  
 J002 W026  
 J001 S047

SEQUENCE NUMBERS

C011  
 E013  
 D014  
 D029

Note: <sup>a/</sup> I = inputs; S = signatures on these inputs.





# APPENDIX F

WILDERNESS ANALYSIS REPORT

RIO CHAMA WILDERNESS STUDY AREA

NM-010-059  
ALBUQUERQUE DISTRICT

TAOS RESOURCE AREA







## SECTION 1

### GENERAL DESCRIPTION

#### NAME CHANGE

The name of this wilderness study area (WSA) has been changed from the Navajo Peak WSA to the Rio Chama WSA. This name change should reduce the confusion to the general public about the WSA's location by directing attention to its primary natural feature.

#### LOCATION

The Rio Chama WSA is located in Rio Arriba County, New Mexico, approximately 3.5 air miles south of El Vado, New Mexico (Map F-1). The WSA is included on three USGS topographical maps--the Boulder Lake Quadrangle, the Tierra Amarilla Quadrangle, and the Navajo Peak Quadrangle.

#### CLIMATE AND TOPOGRAPHY

The Rio Chama WSA is composed of a combination of gently rolling grass and sage plains bordered by dense ponderosa stands and the northern portions of Gallina Peak. The WSA is bisected on a north-south line by the Rio Chama, which meanders through a 900-foot-deep canyon. The WSA ranges in elevation from 6,600 feet (2,000 meters) to 7,500 feet (2,300 meters).

The mean annual temperature for the Navajo Peak region is 44° F (6.6° C). The average annual temperature ranges from 84° F (29° C) during the summer months to 4° F (-16° C) in the winter. July is usually the warmest month and January the coldest.

Annual precipitation ranges from 14 to 16 inches (36 - 41 centimeters). Precipitation is a result of both snowpack and seasonal rainfall.

Winds are primarily from the south and southwest.

#### LAND STATUS

The WSA contains 11,985 acres of public land, with 320 acres of private holdings.

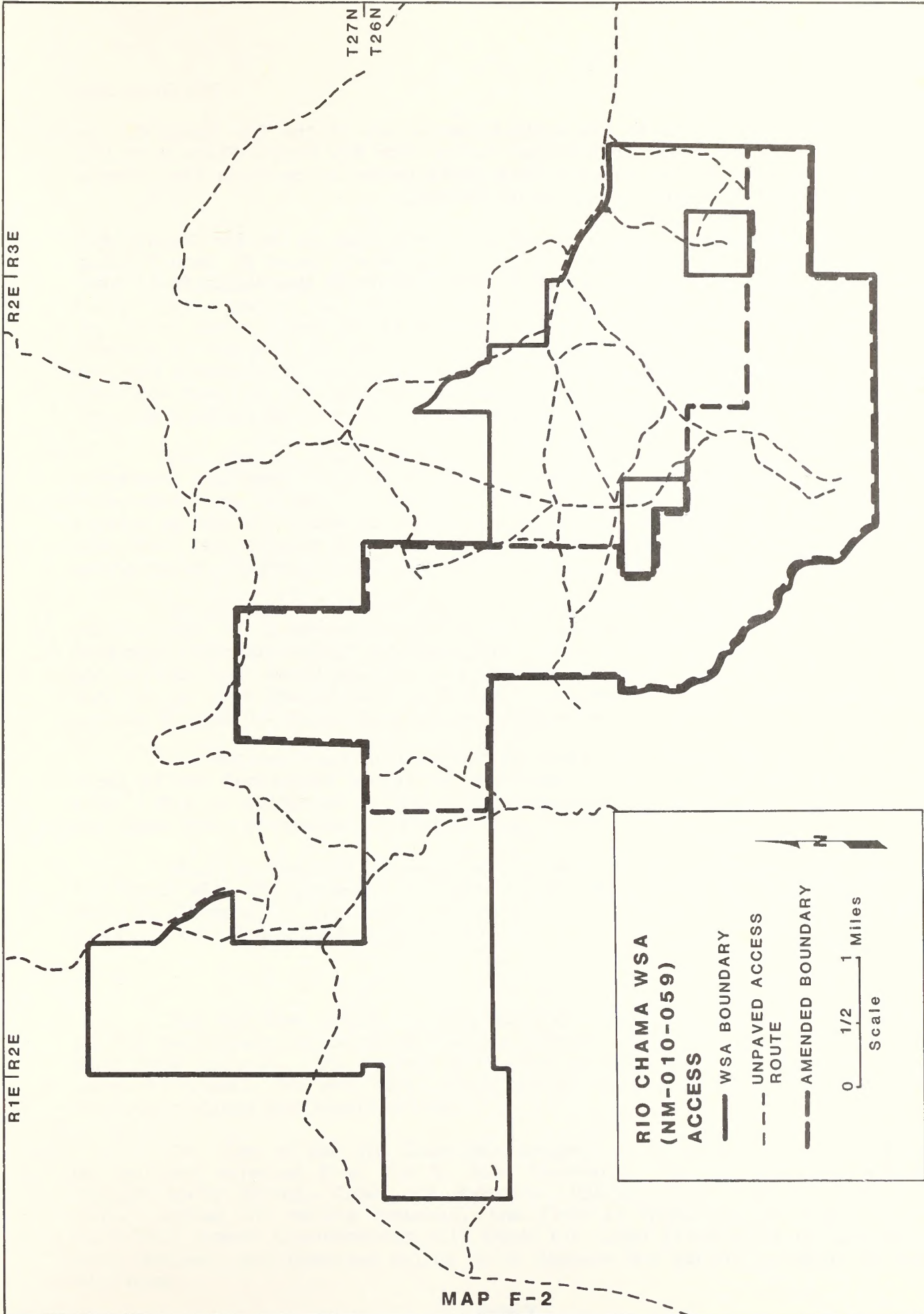
#### ACCESS

Vehicular access to the WSA can be made from both the east and west side of the Rio Chama Canyon (Map F-2). The eastern boundaries of the WSA may be reached from U.S. Highway 84 onto BLM Road 1023 (dirt) 2 miles south of the town of Cebolla. Vehicular routes branch off BLM Road 1023 to provide access to the eastern regions of the WSA. Hikers may reach the WSA by way of the U.S. National Forest Chama River Canyon Wilderness, which lies adjacent to the WSA's southern boundary.









MAP F-2

Vehicular access to the western boundaries of the Rio Chama WSA is provided through the Santa Fe National Forest from New Mexico State Road 112 heading north from Arroyo Blanco. This route presently provides the primary public access to the western portions of the WSA.

The alternative ingress to the WSA is via boat on the Rio Chama. The present put-in point for boaters is at the privately owned El Vado Fishing Ranch, which is located just south of El Vado Dam off of New Mexico State Road 112.



## SECTION 2

## EXISTING RESOURCES

## GEOLOGY

The Rio Chama WSA is located in the eastern portion of the Gallina Fault Zone, a north- and northwest-trending, strongly faulted series of dome-type that extend some 25 miles from the Tierra Amarilla Grant (northern boundary of the WSA) to the Rio Arriba-Sandoval county line. The fault is a southern extension of the Archuleta Arch, which extends some 40 miles to the Archuleta Mesa, on the Colorado-New Mexico line. Together, the two structures form the boundary between the San Juan Basin (west) and the Chama Basin (east).

The WSA is characterized by a surface cover of eastward-dipping Cretaceous sediments (Mancos and Dakota formations) that have been frequently interrupted and offset by faulting. In the western portion of the WSA, erosion by the Rio Chama has resulted in a spectacular gorge up to 900 feet deep that has exposed the underlying Morrison Formation (Jurassic) on the canyon walls. Quaternary alluvium has been deposited on the canyon floor.

While no pre-Morrison rocks have been exposed in the WSA, outcroppings of lower Mesozoic (lower Jurassic and Triassic) and upper Paleozoic (Permian through Mississippian) rocks elsewhere along the Rio Chama and Gallina Fault would seem to indicate that the same rock types underlie the WSA. It is also thought that both the Pennsylvanian and Mississippian rocks overlie Precambrian igneous/metamorphic complexes.

The Gallina Fault is believed to have begun to move shortly after the close of the Cretaceous deposition and appears to have been the axis of an arch. This is evidenced by the thinner sequence of Cretaceous sediments in the Chama Basin as opposed to the San Juan Basin.

While no detailed paleontological inventory has been conducted in the Rio Chama WSA, the presence of known fossil-bearing rocks (particularly the Morrison Formation), indicates a fair to good potential exists for the discovery of paleontological resources.

## WATER

The WSA lies within the Rio Chama drainage, bounded on the north by the Rio Nutrias and the south by the Rio Cebolla, which both feed into the Rio Chama from the west. The surface is rolling, bisected by arroyos flowing into these drainages. The west side, along the Rio Chama, is steep (greater than 20 percent slope) and highly eroded.

The flow of the Rio Chama has seasonal variations that are modified by upstream releases from the El Vado Reservoir. During the late summer through early spring, flows are moderate (100-500 cubic feet per second--cfs). During the spring snowmelt, the flow is high (up to 5,000 cfs). Occasional summer thunderstorms will cause Rio Chama tributaries to flow with heavy sediment and dissolved solids which degrade the quality of water in the Rio Chama.



All surface water from the Rio Chama and its tributaries should be purified for domestic consumption.

Springs are reported to exist within the WSA, but they have not been confirmed. Two hot springs are located on private land north of the WSA boundary along the Rio Chama.

## SOILS

Soil types in the WSA are grouped into two associations. The Las Lucas-Little-Persayo Association occurs east of the Rio Chama Canyon rim on gently to strongly sloping and rolling uplands. Although slopes are predominantly less than 20 percent, some of the Persayo soils occupy hilly landscapes with slopes up to 25 percent. In addition, escarpments and break areas consisting of outcrops of shale and sandstone are commonly steep to very steep. The soils, which are light to moderately light colored, calcareous, and highly erodible, are forming predominantly in materials weathered from gray- and olive-colored shales. They support fair to good stands of vegetation.

The Rock Land-Rough Broken Land Association, along the Rio Chama and below the canyon rim, is characterized by rough and broken topography. This topography includes escarpments, steep canyon walls, rocky ridge tops, rock slides, rock ledges, and steep breaks, all of which are dominated by rock outcrops and small areas of highly variable soils. The exposed bedrock consists of sandstone, shale, tuff, basalt, quartzite, and granite. Those parts of this association with outcrops of tuff, basalt, and sandstone contain vertical or near-vertical, precipitous cliffs and escarpments that surround many of the mesas to form colorful canyon walls along the Rio Chama and tributaries.

## VEGETATION

Within the Rio Chama WSA, a unique diversity of vegetation types exists. They vary from ponderosa pine forests, to riparian vegetation, to a northern cold desert grassland. (The permanent documentation file located at the BLM Taos Resource Area Office contains a vegetation type summary of the WSA.)

The potential natural vegetation according to Bailey-Kuchler would be divided into three types: Pine-Douglas Fir, Pinyon-Juniper Woodlands, and Great Basin Sagebrush. The vegetation type along the rim and above the Rio Chama has a unique development of ecological successional stages. Along the rim the ponderosa pine (Pinus ponderosa) type predominates. Within the understory of the ponderosa pine type is a sub-canopy of mountain shrubs, including oakbrush (Quercus gambelii), serviceberry (Amelanchier spp.), currant (Ribes spp.), and mountain mahogany (Cercocarpus montanus). This understory is an ecotone to the pinyon juniper vegetation type.

The pinyon (Pinus edulis) and juniper (Juniperus spp.) are in dense stands where the contact is with the ponderosa pine type. The subcanopy of pinyon-juniper vegetation type contains sagebrush (Artemisia spp.) and native



grasses, including bluegrama (Bouteloua gracilis), Indian ricegrass (Oryzopsis hymenoides), and side-oats grama (Bouteloua curtipendula).

The pinyon-juniper type melds to the sagebrush type. The sagebrush is the most prevalent vegetation type. The understory contains the same grasses as found in the pinyon-juniper type. During the late 1950's, 1960's, and early 1970's a program of vegetative manipulation was initiated. Large scale sagebrush clearing and subsequent planting of crested wheatgrass (Agropyron cristatum) was completed. On Map F-3, the cross-hatched areas indicate where vegetative modification has been applied, covering approximately 42 percent of the Wilderness WSA .

On shallow soils where sagebrush is not found, the grasses of northern cold desert predominate. Blue grama, Indian ricegrass, and Western wheatgrass (Agropyron smithii) can be found.

In all cases, each vegetation type represents an ecological stage of succession that man has begun to impact. Early homesteading reduced the ponderosa pine type, and recently, the use for pinyon-juniper for fuelwood and fence posts has influenced the natural state of the pinyon-juniper vegetation type. The continued use of forage livestock has greatly altered the successional development of the sagebrush vegetation type.

The vegetation below the canyon rim is limited to steep slopes and shallow soils. The canyon is not significantly impacted by human activity, although there are some signs of early logging enterprises. The riparian areas along the Rio Chama contain the most diversity of species of all the vegetation types within the WSA. The most obvious plant species associated with this area are cottonwoods (Populus spp.), willows (Salix spp.), ponderosa pine, and various deciduous shrubs. The canyon presents a unique diversity of vegetation.

### Threatened and Endangered Plants

According to the Threatened and Endangered Species List prepared by the U.S. Fish and Wildlife Service, no threatened or endangered plants are presently recognized as being indigenous to this locality or known to occur within the study area. Pediocactus papyracanthus or "grama cactus", a candidate for the Threatened and Endangered State List, has been unofficially reported within the WSA.

### WILDLIFE

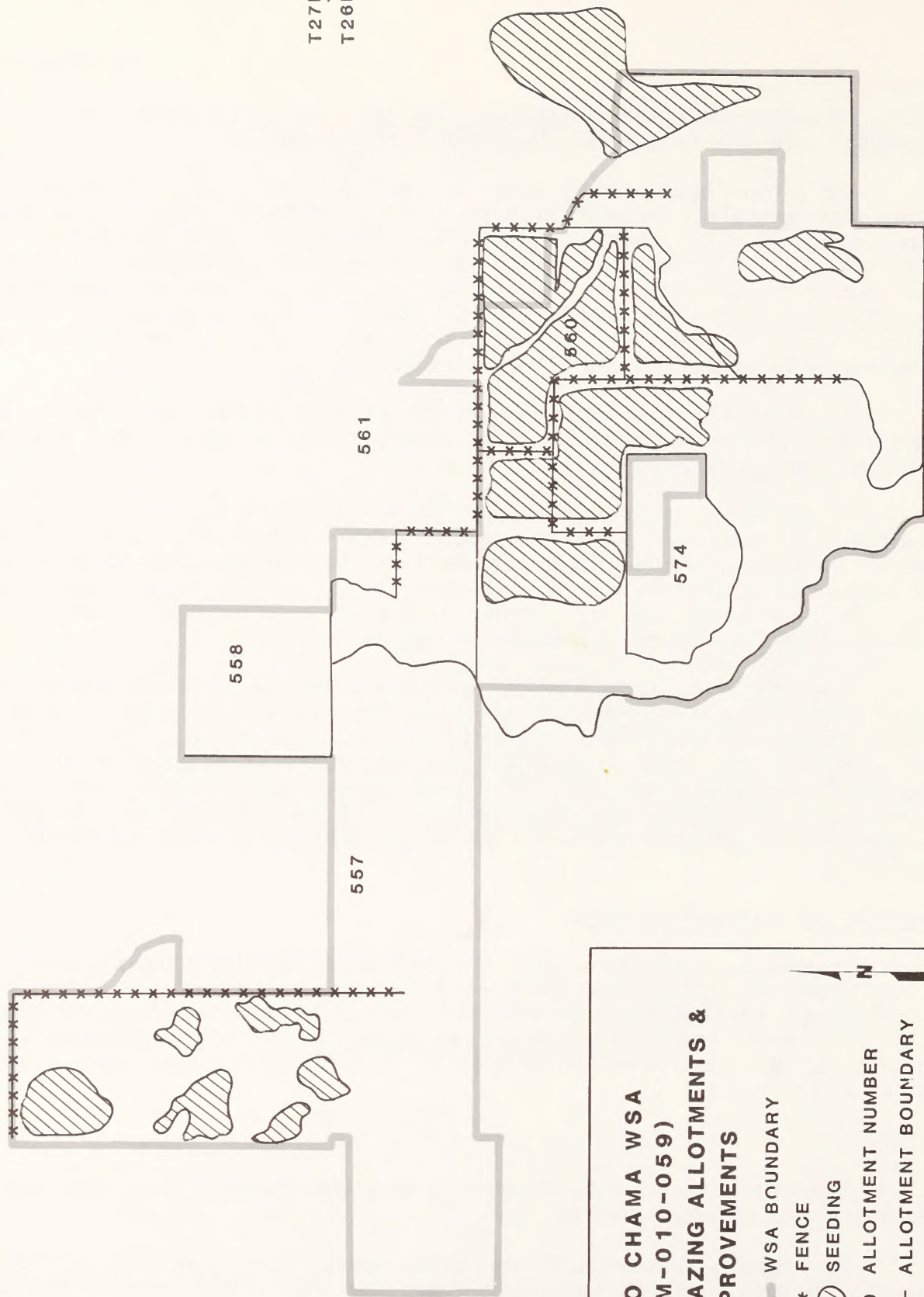
There are several habitat types associated with the vegetation types discussed in the previous section.

The pinyon-juniper and sagebrush types are intertwined by many fingerlike projections that provide an extensive edge effect between the two vegetation types. The high density pinyon-juniper types lie adjacent to the Rio Chama canyon with the sagebrush type lying to either side of the pinyon-juniper band. Some of the areas show heavy forage utilization, with extensive livestock use of browse species such as oakbrush and mountain mahogany, which support the mule deer in the area. Other species using the areas above the canyon rims include elk, black bear, coyote, and turkey.

R1E | R2E

R2E | R3E

T27N  
T26N



**RIO CHAMA WSA  
(NM-010-059)  
GRAZING ALLOTMENTS &  
IMPROVEMENTS**

— WSA BOUNDARY

\*\*\* FENCE

SEEDING

550 ALLOTMENT NUMBER

— ALLOTMENT BOUNDARY

0 1/2 1 Miles  
Scale

**MAP F-3**



The canyon area contains a greater diversity of plant species, excellent cover, and many cliff areas for birds of prey and cavity-nesting birds than does the rim area. This area provides excellent habitat for a wide variety of large mammals (mule deer, elk, and mountain lion), small mammals (bobcat, beaver, and raccoon), avian species (wintering bald eagle, red-tailed hawk, American kestrel, prairie falcon, golden eagle, and Cooper's hawk) and reptiles.

The riparian areas along the Rio Chama augment the habitat diversity of the Rio Chama Canyon and show considerable use by large mammals, passerine birds, aquatic associated mammals and waterfowl.

The aquatic habitat contains a brown and rainbow trout fishery, and populations of native minnows and suckers. The instream cover is provided primarily by large, deep pools, and large boulders. The river is predominately pools with only 20 to 25 percent riffles. The stream bank vegetation is less than optimal due to domestic livestock grazing.

Of the verified significant species, the majority fall within the harvest species category. Recovery species include those discussed under threatened and endangered species. A taxonomic list of probable fauna species which either reside or frequent the area and comprise the remainder of the ecosystem maintenance species is available at the Taos BLM Office.

#### Threatened and Endangered Animals

The threatened or endangered animals confirmed to frequent the area include the federal and state protected bald eagle and peregrine falcon. The black-footed ferret is listed by the U.S. Fish and Wildlife Service but no extensive prairie dog towns exist within the WSA to support the threatened species. The State protected osprey and marten are also considered species which may use the area.

#### VISUAL RESOURCES

The topographic relief is divided into three types - flat, open plain, rolling foothills and the deep river canyon of the Rio Chama. Vegetation varies from lush riparian habitat in the Rio Chama Canyon, to sagebrush and grasses on the open plains, to pinyon-juniper and ponderosa pine in the foothills and higher elevations. Landscape colors within the canyon are light and dark greens from the vegetation and brilliant reds, browns, and orange from the canyon walls. The area above the canyon rims is predominately green, gray, and brown with some variations in the distant background. The overall feeling is one of open expanse above the canyon rims and extreme solitude and isolation within the confines of the Rio Chama canyon.

The Rio Chama Scenic Quality Rating Unit is rated as Visual Resource Management Classes II and III. The Class II designation for the Rio Chama canyon indicates that any change in the basic elements (form, line, color, or texture) caused by a management activity should not be evident in the characteristic landscape. The areas above the rims of the canyon gorge are rated Class III which denotes that any changes in the basic elements caused by management activity may be evident, but should remain subordinate to the

visual strength of the existing character. However, the entire WSA is to be managed as a Class II while under the wilderness review due to the nonimpairment criteria.

#### CULTURAL RESOURCES

The WSA has had no systematic cultural survey. However, surveys in the surrounding two archaeological districts have recorded high densities of archaeological sites. The same pattern is expected in the Wilderness WSA . Based on the review of reported archaeological research in the Chama and Gallina Archaeological Districts, the WSA is expected to contain remains from the PaleoIndian, Archaic, Prehistoric Pueblo. This suggests that a cultural inventory of the WSA would reveal a significant array of cultural resources documenting the cultural development of the region for over 3,000 years. Historic homestead sites have also been identified within the Rio Chama Canyon.

#### AIR QUALITY

Due to the remoteness of the WSA from any sources of air polluting emissions, the air quality in the WSA is considered good to excellent.



## SECTION 3

## EXISTING AND POTENTIAL USES

## MINERAL DEVELOPMENT

Energy Minerals

## Leasable

No drilling activity has occurred within the Rio Chama WSA. However, most of it has been leased for oil and gas development and the U.S. Geological Survey has rated it as being prospectively valuable for oil and gas. The WSA is only about 5 miles northeast of the producing Puerto Chiquito Oil and Gas Field. The WSA appears to be on the same or a similar structural trend as this field and contains known producing formations.

Some coal may be present in small amounts in the Dakota Formation. The only major coal-bearing formation in the vicinity, the Menefee Formation (Upper Cretaceous), does not occur within the Rio Chama WSA. Consequently, the potential for coal development is considered to be very low.

## Locatable

A great deal of uranium exploration has taken place in the vicinity of, and possibly within the Rio Chama WSA. Some small uranium occurrences have been found in the region, often associated within organic matter (e.g., bones and plant debris), but no uranium occurrences have been reported in the WSA. While there does not appear to be a very high potential for the discovery of large uranium deposits in the Rio Chama WSA, the presence of the Burro Canyon (Cretaceous), Morrison (Jurassic), and Chinle (Triassic) Formations in the WSA, all known to contain uranium elsewhere, warrants a more detailed study before a conclusion can be made as to the potential for uranium occurrence.

Non-Energy Minerals

## Leasable

While nearly all non-energy leasable minerals are found in sediments and the Rio Chama WSA contains a relatively thick sequence of sedimentary rocks, the potential for the discovery of valuable non-energy leasable minerals is low. The possibility of finding phosphates is remote, since there are no known phosphate-bearing formations located in the WSA. Likewise, the possibility of finding sodium or potash deposits are also remote, since there are no known occurrences in any of the sediments, nor are there any known alkali basins within the WSA.

## Locatable

At present, there is no activity in the Rio Chama WSA pertaining to locatable non-energy minerals. There are no mining claims located in the immediate area and there has been no known exploration or development

attempts. There may be a slight chance of finding "red bed" copper deposits (i.e., copper carbonates) in the Triassic Chinle Formation, since these deposits have been found in the Chinle elsewhere. However, the probability of finding other locatable mineral deposits in the sedimentary rock sequence seems low, since there are no igneous intrusions (which would bring mineral-rich solutions) and no apparent mineralization occurring along the various fault planes. Therefore, it is concluded that the potential for valuable mineral deposits in the sediments is low.

There is a possibility of finding massive sulfides (e.g., copper, lead, zinc, molybdenum) in the Precambrian igneous/metamorphic complex that underlies the WSA. However, more data would be required before an evaluation of the potential occurrence of massive sulfides can be made.

#### Salable

Even though most of the sediments found in the WSA are friable sandstones and shales, easily eroded and not very cemented, they are not considered to be very good sources of aggregate. The Precambrian igneous/metamorphic rocks are too deep to have very much potential as a source of saleable minerals. The alluvium found in the Rio Chama is too inaccessible to be considered as a potentially valuable source of mineral materials.

#### WATERSHED

Several water catchments are the only structures for water control within the WSA. Water from the Rio Chama and its tributaries are utilized by livestock and wildlife.

In the event the Abiquiu Reservoir, located downstream from the WSA, increases its storage capacity the flow of the Rio Chama may be affected. More frequent releases of water from El Vado Reservoir during the late summer would result. Consequently, the flow would be higher than has been normal for that time of year.

#### LIVESTOCK GRAZING

The WSA encompasses five livestock (cattle) grazing allotments. The primary use period is spring-summer-fall with no use in winter due to snow pack. Allotment Management Plans have been completed on two allotments (a file copy is available at the BLM Taos Resource Area Office).

The range improvements within the WSA are extensive (see Map F-3 in Section 2 of this appendix). Many existing fences originally built to aid the sage clearing and reseeding projects are being scheduled for removal. A summary of the existing range allotments is found in Table F-1.

#### FOREST PRODUCTS

The Rio Chama WSA contains an abundant supply of commercial and non-commercial woodlands. The commercial supply consists primarily of ponderosa pine. There are approximately 350 acres with potential total production of over 50,000 board feet. There are approximately 1,500 acres of pinyon-juniper non-commercial woodlands with a total potential fuelwood market for approximately 15,000 cords.



TABLE F-1

## ALLOTMENT SUMMARY

Allotment Name	Number	Number of Head	Season of Use		Animal Unit Months
			Start	End	
Hibner AMP II <sup>a/</sup>	0560	86	10/26	12/31	875
Puerto Community	0557	208	5/1	10/31	961
Esperanza Grazing Association <sup>a/</sup>	0561	345	4/16	10/15	2,070
Jones	0558	16	3/1	10/30	120
Peacock Place	0574	20	4/1	7/1	36

Source: Allotment files, Taos Area Office, BLM.

Note: <sup>a/</sup> AMP Allotments.

Favorable topography has allowed for selective cuttings for timber sales in the past. An additional 80 acres of thinning, for enhancement of timber production, and 100 acres of clearcutting for mistletoe eradication, were performed within the WSA prior to 1975.

Three forestry study plots are located within the boundaries of the WSA. These study plots have been used to monitor overall timber production for potential future timber sales.

The 1979 Rio Grande Management Framework Plan does not recognize the potential use of areas within the Rio Chama WSA for future timber harvest. No specific plans for issuing sales or permits are being considered at the present time.

#### RECREATION

A 30-mile segment of the Rio Chama, immediately below El Vado Reservoir to the headwaters of the Abiquiu Reservoir, was designated in 1978 by the New Mexico State Legislature as a "Scenic and Pastoral River". The portion of the WSA within the Rio Chama "Scenic and Pastoral River" was floated by over 1,500 people during the 1983 river season. These were primarily one night trips. Floating, camping, fishing, and hiking are the primary recreation activities occurring within this river corridor, resulting both from these trips and from other users. Hikers and backpackers from the adjacent U.S. Forest Service Chama River Canyon Wilderness Area also utilize portions of the WSA, especially along the Rio Chama.

Very little recreation activity occurs above the rims of the Rio Chama gorge in the WSA. Some hunting activity is apparent from old hunting camps found in some of the pinyon-juniper stands. The Rio Chama WSA is within New Mexico Game and Fish Management Unit #5. The permanent documentation file has a listing of elk and mule deer hunting pressure, harvest and success for 1980 and 1981. Fishing use is also quantified for the Rio Chama.

#### EDUCATION/RESEARCH

The U.S. Fish and Wildlife Service is presently conducting a study to determine fishery and riparian habitat on the Rio Chama.

The Bureau of Land Management and U.S. Forest Service have a cooperative agreement in effect for the study of the commercial and private boating use on the Rio Chama. Recommendations for use allocation and protective management will be in effect for the 1984 river use season.

The Rio Chama is one of only two floatable streams in New Mexico and represents a unique educational opportunity for study of a river environment from the confines of the river itself. Many educational entities (University of New Mexico, New Mexico State University, Santa Fe Mountain Center, Albuquerque Public Schools, Boy and Girl Scout Organizations) have conducted environmental education excursions on the Rio Chama for the study of this unique biological ecosystem.



## NATIVE AMERICAN USES

No areas currently of religious significance to Native Americans are known within the study area. Shrines constructed by prehistoric populations probably do occur throughout the area.

## REALTY ACTIONS

No rights-of-way, withdrawals, easements, or permits exist in this WSA. Two parcels of private land occur within the boundaries of the WSA to which reasonable access must be provided.

## WILDLIFE

The portion of the Rio Chama which is within the WSA provides a suitable habitat and food base for the river otter. The potential for introduction of the river otter is dependent upon the amount of privacy and protection the species would receive. It may be necessary to restrict, as well as inform, boaters if such a project was implemented. Currently, there is no official recommendation documented.

The sage grouse is a state-protected bird because the northwestern portion of New Mexico is at the periphery of the bird's range. The sagebrush plain found within the WSA, above the Rio Chama, is characteristic habitat for the sage grouse. Therefore, the sage grouse may also be a potential candidate for introduction. If introduction took place, restrictions on vehicle and human activity would need to be considered. Introducing the sage grouse to the Rio Chama WSA is theoretical at this time.

No Habitat Management Plan is scheduled to be written by the 1986 fiscal year. If a Habitat Management Plan were to be prepared, the Rio Chama WSA would be intensively inventoried and other potential uses would be more accurately identified.





## SECTION 4

## WILDERNESS CRITERIA

## EVALUATION OF WILDERNESS VALUES

Quality of Mandatory Wilderness Characteristics

## Naturalness

The amount and degree of impacts affecting the naturalness of the area are distinctly divided between the Rio Chama Canyon and the open range above its rims.

The Rio Chama Canyon provides the most distinctive indications of naturalness throughout the WSA. (Refer to Figures 1 through 4.) The views and vistas in and directly above the canyon give one a true feeling of naturalness. Most intrusions are hidden by the canyon walls and are therefore not noticeable from the Rio Chama.

The river canyon is contrasted with the open range topography above. Impacts of human activities are more visible and apparent above the canyon rims. Visible impacts include range improvements (e.g., windmills, catchments, seedings, fencelines), vehicular routes, private homes and ranch operations, and utility lines. The private inholdings in the WSA are all located outside the Rio Chama Canyon.

The most noticeable impacts in the WSA are the 20 miles of existing vehicular routes, used primarily for access to range improvements requiring maintenance on an annual basis (see Map F-3 in Section 2). Some of the routes are also to access hunting, camping, and fishing in the Rio Chama Canyon area.

The presence of man-made intrusions above the canyon in the WSA detract from the potential natural qualities of the area. The cumulative effects of these impacts is minimal in the canyon. During the Wilderness Inventory, it was difficult to classify the naturalness of the WSA into one category due to the distinct contrast between the canyon and the rim area.

## Solitude

The opportunities for solitude in the Rio Chama WSA are outstanding. The topographic and vegetative screening of the Rio Chama Canyon offer a tremendous experience of solitude for visitors who are down by the river. A truly unique feeling of isolation is possible while either floating or hiking the inner canyons below the rims.

The opportunities for solitude are primarily due to limited access to the river. As a result, fewer encounters with humans are anticipated. Also, evidence of human activity found above the canyon are mitigated by vegetative and topographic screening when the user is down by the river. A user can readily find seclusion within the river canyon boundaries.



Figure 1 - View from Rio Chama below Navajo Peak looking north and east.



Figure 2 - View from Navajo Peak overlooking private inholdings (vacation homesites) and Santa Fe U.S. Forest Service Chama River Canyon Wilderness Area (south).



Figure 3 - Side canyon entering the  
Rio Chama from the east.

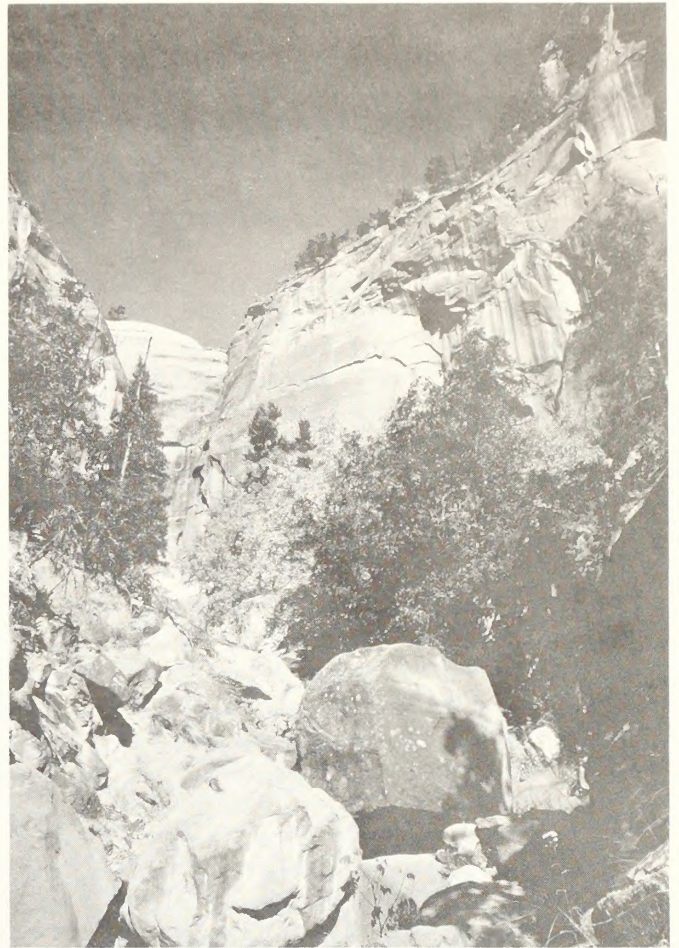
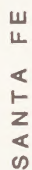


Figure 4 - View of the Rio Chama from  
below the El Vado Reservoir.





MAP F-4



The chances for solitude are somewhat diminished above the rim due to daily ranching operations and the closeness of U.S. Highway 84. But solitude may still be achieved by the user in secluded locations which are easily found above the canyon rims.

### Opportunities for Primitive and Unconfined Recreation

The Rio Chama WSA offers a variety of outstanding primitive and unconfined recreation opportunities. The most significant recreational feature of the Rio Chama WSA is the river itself, where boating occurs several months out of the year (April-July). Other opportunities for primitive and unconfined recreational activities besides boating include backpacking, hiking, cross-country skiing, and camping. These activities do not require facilities or motorized equipment and are easily available in the study area.

### Special Features

The Rio Chama "Scenic and Pastoral River" (New Mexico State Designation in 1978) flows through the Rio Chama WSA. This is the single most important and valuable natural feature of the study area. The Rio Chama Canyon provides one of only two floatable rivers in northern New Mexico. This makes the Rio Chama not only unique in its recreational boating opportunity, but increases its future potential demand due to the growing sport of river running throughout the West.

The viewing of geologic features, wildlife, and riparian vegetation from the river make the Rio Chama portion of the WSA a special feature.

The U.S. Forest Service Chama River Canyon Wilderness Area is located immediately south and west of the WSA. Map F-4 shows the location of the wilderness area. These specific state and federal protective designations are indicative of the special nature of the Rio Chama Canyon.

### Multiple Resource Benefits

The Rio Chama WSA contains a wealth of natural values as a result of its relatively undisturbed character. Congressional designation as wilderness would carry the weight of law and would provide a greater degree of long-term protection for these natural values than would administrative designations available to the Bureau.

A more detailed discussion of multiple resource benefits may be found in Section 6 under the discussion of the impacts of the All Wilderness Alternative.

### Diversity in the National Wilderness Preservation System

#### Ecotypes Present

The Bailey-Kuchler system classifies the Rio Chama WSA as being within the Rocky Mountain Forest Province. The potential natural vegetation according to Bailey-Kuchler is Pine-Douglas Fir, Pinyon-Juniper woodlands and Great Basin Sagebrush.



The general nature of the Bailey-Kuchler system fails to adequately show the variety of vegetation types within the WSA. The vegetation types identified within the WSA consist of approximately 5,000 acres of midland shrubs, 4,700 acres of midland grasslands, 1,000 acres of pinyon-juniper woodlands, 800 acres of conifer forests (ponderosa pine) and 485 acres of riparian vegetation along the river.

#### Distance from Major Population Centers

The WSA is within three hours driving time of Albuquerque, New Mexico. The spectrum of recreational opportunities would not be significantly expanded through wilderness designation but boating use of the Rio Chama is expected to increase due to the close proximity of Albuquerque.

#### MANAGEABILITY

The ability to manage the Rio Chama WSA as a wilderness area is influenced by private lands within the study area, legal and physical access, range operations, and uses of adjacent U.S. Forest Service lands.

The WSA contains 320 acres of private inholdings in two parcels which must be provided reasonable access regardless of any protective designation.

Visitor access to the WSA, if designated wilderness, could be obtained through adjacent U.S. Forest Service lands. Users may approach the area from the Chama River Canyon Wilderness Area located at the southern end of the WSA and east of the Rio Chama. Visitors may also gain access through the Santa Fe National Forest on the west side of the Rio Chama.

Regardless of whether the Rio Chama WSA becomes a wilderness area or not, access to the river by boaters must be considered. The major put-in point for boaters on the Rio Chama is the El Vado Fishing Ranch, located below El Vado Reservoir and owned by Mr. Carl Cooper. Presently, the Bureau of Land Management and the Santa Fe National Forest have an informal cooperative agreement for continued access by the public for the use of Mr. Cooper's private land as a launching site for floating the Rio Chama. In the event Mr. Cooper declines to allow public access to the river, an access point would be requested on Bureau of Reclamation lands immediately below El Vado Reservoir on the Rio Chama.

The rolling, open terrain of the WSA above the Rio Chama Canyon rims allows for unlimited access for off-road vehicle use. The major demand for use by motor vehicles occurs when maintenance is necessary on range improvements and during the hunting season when hunters traverse the eastern rim area for mule deer and elk. ORV use would be restricted if the WSA was designated as a wilderness area. It would be difficult to effectively control vehicular use on the top rim areas without additional fencing and signing.

The WSA's southern boundary is contiguous with the U.S. Forest Service Chama River Canyon Wilderness Area. Management of the Rio Chama WSA as a wilderness would be enhanced by this situation since nonconforming uses that might otherwise diminish wilderness values along the WSA's southern boundary will not occur.



Since the wilderness values of the Rio Chama Canyon are very high, specific management for this area is suggested whether the area is designated a wilderness area or not. Currently, the Bureau of Land Management and U.S. Forest Service have a cooperative study involving commercial and private boating use on the Rio Chama. Use allocation and protective management are in effect on the river. Potential protective measures may also be considered through a protective designation by the BLM or through inclusion under the Federal Wild and Scenic Rivers Act.





## SECTION 5

## PUBLIC INVOLVEMENT OVERVIEW

Public involvement for this WSA began with the Rio Grande Management Framework Plan (1979) and continued throughout the Taos Resource Area Roadless Study, the resulting WSA recommendation phase, and the Off-Road Vehicle Designation Plan which included the Rio Chama WSA. Public involvement for the Rio Chama WSA has included input throughout the Taos Resource Area Roadless Study and resulting WSA recommendation. There were also two open houses held for public input regarding the Rio Chama WSA. One was held in Albuquerque, New Mexico, on April 28, 1983, and the other in Taos, New Mexico, on April 26, 1983.

Public involvement specifically concerning the Rio Chama WSA has primarily been in the form of written comments. The majority of written comments indicate that Rio Chama qualifies as a wilderness due to its scenic beauty and opportunities for solitude and primitive types of recreation: hiking, camping, and boating. Comments have also been made expressing the need to extend the wilderness boundaries from the upper reaches of the U.S. Forest Service's Chama River Canyon Wilderness Area. Those who expressed support for wilderness designation also discussed the need to protect the Pediocactus paprycanthus, "grama cactus", which has been unofficially reported in the WSA and is a potential candidate for the New Mexico Threatened and Endangered Plant Species List.

During the public comment period on the Albuquerque District Wilderness Draft Environmental Assessment (March 1983), 23 inputs were received on the Rio Chama WSA. Of these inputs, 22 favored wilderness designation of the area. These inputs primarily noted the uniqueness of the Rio Chama Canyon and the fact that the proposed WSA is adjacent to the existing U.S.F.S. Chama River Canyon Wilderness Area.

Five inputs which favored designation questioned the amended boundary recommendation and were concerned that the amended boundary recommendation did not provide enough acreage to properly protect the river canyon. Several different proposals were made to reduce the acreage from the original 11,985 acres yet still provide for a buffer area to the canyon.

One input was received by the Continental Divide Trail Society which indicated the Rio Chama Canyon is a potential corridor for the Continental Divide National Scenic Trail, and the wilderness designation for the Rio Chama could help to assure protection of its scenic and recreational values.

Comments regarding manageability included recommendations for coordinating access needs with the U.S.F.S., Bureau of Reclamation, and N.M. Department of Natural Resources.

The single input opposing the wilderness designation pointed out that the area is on the eastern flank of the San Juan Basin and oil production is present three miles west at the Puerto Chiquito Field.

The comments cited in these inputs reflect a concern held by most of the respondents that the area should be protected through wilderness designation. The other major concern was that the final ammended boundary be sufficient to provide the protection and isolation afforded to the adjacent U.S.F.S. Chama River Canyon Wilderness so that a consistent wilderness experience may be available throughout the Rio Chama corridor.



## SECTION 6

## ALTERNATIVES AND IMPACTS

This section discusses four alternatives for the Rio Chama WSA: the All Wilderness Alternative, the Amended Boundary Alternative, the No Wilderness Alternative (Amend the Rio Grande Management Framework Plan), and the No Action Alternative (manage under the existing land use plan).

## ALL WILDERNESS ALTERNATIVE

Under this alternative the entire 11,985 acres of public land within the Rio Chama WSA would be recommended suitable for wilderness designation (refer to Map F-1 for location of the WSA boundary).

Impacts on Wilderness

If designated wilderness, the existing uses and activities in the area and potential uses as identified in Section 3 of this document would be managed under the constraints of the Wilderness Management Policy (BLM, 1981).

Under the All Wilderness Alternative, the wilderness values present in the WSA would benefit significantly from the added long-term protection of Congressional designation. Impacts to soils, visual resources, vegetation, education/research, realty actions and Native American Uses are not significant; therefore, they were not included in the following discussion.

Impacts on Minerals

Designating the Rio Chama WSA as wilderness could prevent any large scale exploration efforts and development of mineral deposits located within the WSA. However, the likelihood and demand for mineral development is moderate to low in the area. Wilderness designation should not significantly impact mineral development.

Impacts on Other Resources and Uses

## Watershed

There would be no significant impacts to surface water if the entire WSA were designated as wilderness. Under wilderness designation, treatment of the watershed would be restricted to nonmotorized equipment. Prevention of surface disturbance would protect the surface and consequently stabilize watershed conditions by increasing infiltration rates and decreasing surface run-off.

## Wildlife

The primary impact of this alternative would be to ensure habitat privacy, of growing importance to the stability of elk herds in northern New Mexico. This alternative should significantly benefit wildlife.

## Cultural Resources

Wilderness designation would limit potential disturbances on cultural sites. In a wilderness area site stabilization and excavation may be approved by the State Director on a case-by-case basis where the project will not degrade the overall wilderness character and when needed to preserve the particular cultural resource. The overall impact to cultural resources of designation would not be significant.

## Livestock Grazing

There would be no significant impact on the range program if the entire WSA were designated wilderness. Existing livestock operations would be allowed to continue at existing levels in the designated wilderness.

## Forest Products

The 50,000 board feet of commercial timber and 1,500 cords of pinyon-juniper fuelwood would not be allowed to be cut. Since there are presently no plans for commercial timber or fuelwood sales in the WSA no impact would occur.

## Recreation

The All Wilderness Alternative would enhance certain recreation opportunities such as hiking and backpacking, but would restrict those that require motorized vehicles such as car camping, hunting, and off-road vehicle activities. Vehicle access by hunters would be prohibited inside the wilderness, which might result in lower hunter success ratios. Boating use would not be impacted since the put-in and take-put points are located outside the proposed boundaries. The overall impact to recreation use would not be significant, since current ORV use is low.

## AMENDED BOUNDARY ALTERNATIVE

The Amended Boundary Alternative would recommend for wilderness designation the entire river corridor and one-quarter mile beyond the canyon rims (refer to Map F-1). The area recommended for wilderness encompasses approximately 5,232 acres and is 5 miles in length. The area described would fall under the legal description found in the Enclosure 1 to this appendix.

This amended boundary alternative may prove more feasible for manageability than the All Wilderness Alternative and at the same time preserve the Rio Chama Canyon which requires more protective measures than the areas above the rims. The area proposed is adjacent to the existing U.S. Forest Service Chama River Canyon Wilderness (Map F-4 in Section 4 of this appendix) and joint management procedures would be appropriate for the proposed Amended Boundary Wilderness Alternative. Impacts to soils, visual resources, vegetation, education/research, realty actions, and Native American Uses are not significant; therefore, they will not be included in the following discussion.



### Impacts on Minerals

Impacts to minerals caused by this action are expected to be minimal due to the location of the mineralized area (oil and gas) being primarily above the canyon rims.

### Impacts on Other Resources and Uses

#### Watershed

This action would provide protection for the canyon slopes but not the area beyond 1/4-mile from the rim. Off-road vehicle use is restricted already in both areas.

#### Wildlife

The canyon's wildlife habitat which is by far the most critical within the study area would benefit significantly through ensured protection.

#### Cultural Resources

The Amended Boundary Alternative would serve to preserve the historic homestead sites along the banks of the Rio Chama by providing stipulations for the protection of the cultural sites under the Wilderness Act.

#### Livestock Grazing

There would be no significant impact on the range program if the Amended Boundary Alternative was implemented. No new range improvements are planned for the Rio Chama Canyon area.

#### Forest Products

This alternative would have no significant impacts on the commercial timber and fuelwood since no sales are planned for the area within the amended boundary.

#### Recreation

The non-motorized boating use and other primitive recreation activities which occur in the canyon would continue while not significantly restricting recreation use requiring vehicles (ORV use, hunting, camping, sightseeing, etc.) in the area beyond the rim. This alternative would significantly benefit the aesthetic qualities and outstanding primitive recreation values in the BLM section of the Rio Chama and combine it with the existing U.S. Forest Service Chama River Canyon Wilderness Area.

### NO WILDERNESS ALTERNATIVE (AMENDING THE RIO GRANDE MANAGEMENT FRAMEWORK PLAN)

The existing Rio Grande Management Framework Plan would be amended to provide special protective designations for the canyon area described in the Amended Boundary Alternative.

This alternative would protect the natural values of the Rio Chama Canyon if the WSA did not receive wilderness designation. Recommendations include: (1) continue to propose the Rio Chama for federal designation as a "Wild and Scenic river"; (2) propose a special protective agency designation for the BLM-administered position; and (3) develop a joint management agreement with the U.S. Forest Service and State of New Mexico for protective management actions for preservation of the natural values and primitive recreation opportunities of the Rio Chama. Impacts to soils, vegetation, visual resources, education/research, Native American Uses, realty actions, and forest products are not significant; therefore, they were not included in the following discussion.

#### Impacts on Wilderness Values

The impacts to wilderness values would not be significant because this alternative protects the canyon which contains the primary wilderness values of the WSA. However, without designation by Congress wilderness values would not be provided the more permanent long-term protection of law.

#### Impacts on Minerals

This alternative would create no significant impacts on mineral exploration and development. There are presently no known plans for mineral activity within the Rio Chama Gorge because the primary mineral values are located above the canyon rims, and therefore outside of the boundaries of the Amended Boundary Alternative.

#### Impacts on Other Resources and Uses

##### Watershed

This alternative would serve to enhance the watershed values through increased protection and management, and limitations on mechanized equipment and vehicular use.

##### Wildlife

Any protective management actions within the Rio Chama corridor would minimize disturbance to wildlife habitat. This alternative would enhance the wildlife program and potentially improve wildlife numbers and opportunities for viewing wildlife.

##### Cultural Resources

This alternative would increase protection and preservation of the cultural and historical resources within the Rio Chama Canyon.

##### Livestock Grazing

The protective measures proposed for the canyon would not impact livestock grazing in the WSA.



## Recreation

This alternative would benefit the recreation activities available within the Rio Chama Canyon through protective management of the river corridor. Any measures of preservation of the natural values of the Rio Chama would enhance the quality of the recreation experience in the canyon.

## NO ACTION ALTERNATIVE

Under this alternative, the entire WSA would be managed under the existing Rio Grande MFP. Impacts to soils, visual resources, vegetation, education/research, realty actions, and Native American Uses are not significant; therefore, they were not included in the following discussion.

### Impacts on Wilderness Values

The No Action Alternative would have more significant impacts on the wilderness values of Rio Chama Canyon than the areas above the rims. The rim areas are not presently experiencing detrimental use which would impair the natural values. This alternative could have significant impacts on the wilderness and aesthetic values of the inner canyons of the Rio Chama through a lack of protective management.

### Impacts on Minerals

This alternative would result in no significant impacts on mineral exploration and development.

### Impacts to Other Resources and Uses

#### Watershed

No significant changes in watershed conditions would occur as a result of the No Action Alternative.

#### Wildlife

Unknown future actions could reduce habitat privacy, surface character, and the stability of the productive wildlife areas.

#### Cultural Resources

A recommendation to take no action will not affect cultural resources since it will create no new disturbance to cultural sites.

#### Livestock Grazing

There would be no significant impact on the range program with this alternative.

#### Forest Products

A No Action decision would not affect timber resources.

## Recreation

There would be no impact to the recreation activities which occur in that portion of the WSA above the canyon rim. However, there is presently no protective designation for the river canyon in this WSA. This situation could eventually result in occurrence of activities which would conflict with the primitive recreation uses of the canyon such as boating, hiking, and camping.



# APPENDIX G

WILDERNESS ANALYSIS REPORT

SABINOSO WILDERNESS STUDY AREA

NM-010-055  
ALBUQUERQUE DISTRICT

TAOS RESOURCE AREA







## SECTION 1

## GENERAL DESCRIPTION

## LOCATION

The Sabinoso WSA is located in San Miguel County, New Mexico, approximately 8 air miles northeast of Trujillo, New Mexico, 20 air miles northwest of Conchas Reservoir, and 1 mile due west of Sabinoso, New Mexico (Map G-1). The WSA is included on four USGS topographical maps: the Maes Quadrangle, the Sabinoso Quadrangle, the Canon Olguin Quadrangle, and the San Ramon Quadrangle.

## CLIMATE AND TOPOGRAPHY

The WSA is composed of a series of high, narrow shelves surrounded by steep, rock-walled canyons. Elevation in the WSA ranges from 4,500 feet (1,500 meters) to 6,000 feet (2,000 meters). The WSA's western boundary runs along the bottom of Canyon Largo, which enters the Canadian River at the Town of Sabinoso. The Canyon Largo is an ephemeral stream.

The mean annual temperature for the Sabinoso WSA is 55° F (13° C). The average annual temperature ranges from 90° F (32° C) during the summer months to 20° F (-6° C) in the winter. July is usually the warmest month and January the coldest.

Annual precipitation ranges from 14 to 18 inches (35.6 to 45.7 centimeters). Precipitation is mainly the result of spring and summer rainfall.

Prevailing winds are primarily from the south and southwest.

## LAND STATUS

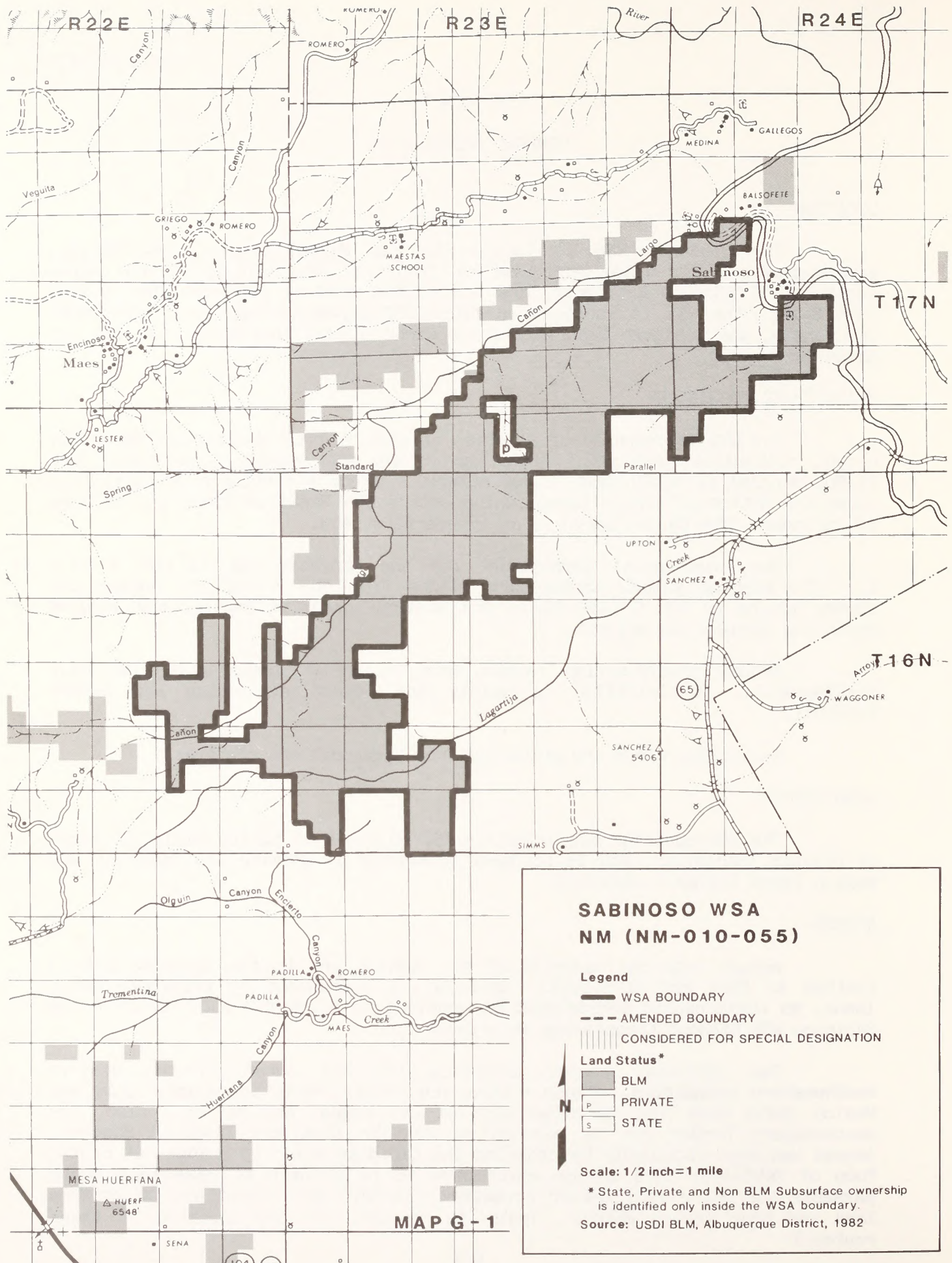
The WSA contains approximately 15,760 acres of public land, 320 acres of private inholdings, and is bordered primarily by private and State of New Mexico lands (refer to Map G-1).

## ACCESS

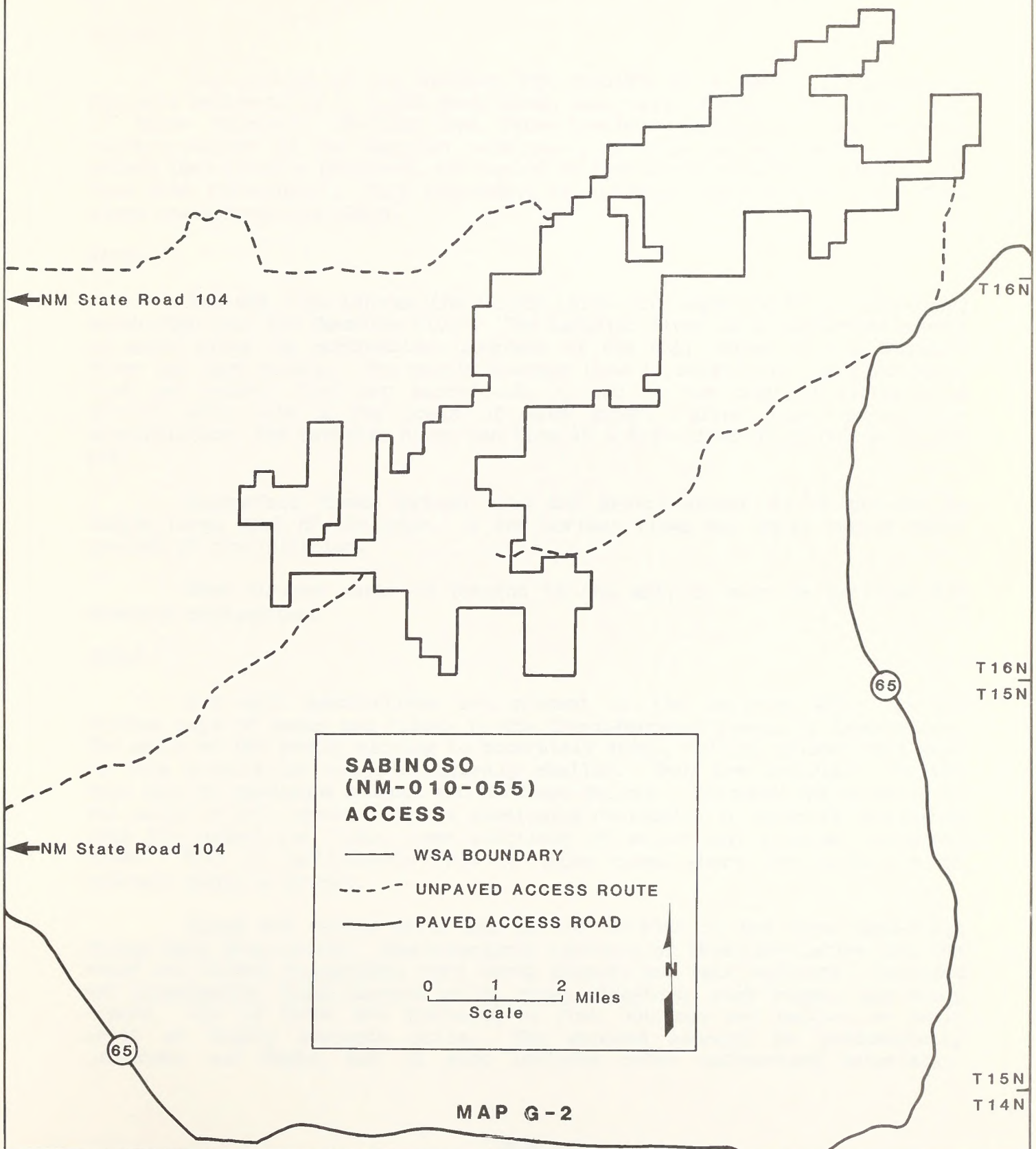
Access into the majority of the public land in the Sabinoso WSA is limited to foot and horseback. Sabinoso is surrounded by privately owned lands, so legal public access must be acquired to allow visitors to enter the Sabinoso WSA without trespassing on private land.

Two vehicular routes accessing the WSA enter on the western southwestern boundaries. These routes are county roads accessible from New Mexico State Road 104, 20 miles east of Las Vegas, New Mexico. Also, the southeastern border can be reached by vehicle from the Town of Sanchez. Access was once attainable by crossing the Canadian River by bridge out of the Town of Sabinoso; this bridge would have to be rebuilt to make this route passable for motor vehicles or horseback riders. All routes are on private land and have locked gates. (Refer to Map G-2 for the location of these routes.)













## SECTION 2

## EXISTING RESOURCES

## GEOLOGY

The geology of the Sabinoso WSA consists of a mantle of flat-lying Mesozoic sediments up to 2,000 feet thick, underlain by approximately 500 feet of Upper Paleozoic (Permian and Pennsylvanian) sediments. The dominant surface feature is the Canadian Escarpment, a large east-northeast trending upland that forms a prominent rim capped by Cretaceous sandstones (Dakota and Misa Rica Formations). This escarpment is situated approximately 1,100 feet above the surrounding plain.

## WATER

The WSA lies between the Canyon Largo and Lagartija Creek drainages, which flow into the Canadian River. The Canadian River is a year-round source of water along the northeastern boundary of the WSA. Flows of the Canadian River can vary widely. The yearly average flow is relatively low (100 cubic feet per second--cfs ), and it can drop to virtually a trickle with only a few pools of warm water. After heavy periods of precipitation, the Canadian River can flow at a high level of 10,000 to 20,000 cfs.

Subsurface flows through sand and gravel appear to be present in Canyon Largo most of the year. A few surface flows may exist during heavy periods of precipitation.

When surface water is present in the WSA, it must be purified for domestic consumption.

## SOILS

Two soil associations are present in the Sabinoso WSA. On the flatter tops of mesas and ridges is the Crews-Bernal-Travessilla Association. The soils on the gently sloping to moderately steep, rolling uplands that make up this association are predominantly shallow. They are underlain for the most part by sandstone bedrock and hardened caliche. Although the majority of the soils in this association are developing residually in materials weathered from the underlying rocks, some additions of eolian and alluvial sediments occur. This is particularly true in those cases where the soils are of moderate depth or deeper.

Along the canyon walls and in the bottoms is the Rock Land-Rough Broken Land Association. Characteristic features of this association are the rough and broken topography, very steep slopes, and rock outcrops. Included are escarpments, steep canyon walls, rocky ridgetops, rock ledges, and steep breaks. All of these are dominated by rock outcrops and patches or small areas of highly variable soils. The exposed bedrock is predominantly sandstone and shale, but it also includes other sedimentary materials.

Moderately extensive areas of shallow soils may occur on the ridge crests and mesa tops. The deep soils are confined generally to small areas in narrow valley bottoms and on slopes at the base of escarpments.

## VEGETATION

The topography of the Sabinoso WSA dictates its vegetation. The rugged country primarily supports pinyon and juniper shrubs, with a perennial warm season grass savanna along the smoother mesa tops.

The pinyon/juniper woodlands include pinyon, juniper, and ponderosa pine. Understory shrubs associated with these trees are wavyleaf oak, shinnery oak, mesquite, mountain mahogany, berberis and a variety of cacti. Along the canyon bottoms where the water table is high and streams sometimes flow, riparian species are found including cottonwood and willow.

The grasslands along the mesa tops are made up predominantly of blue grama, hairy grama, sideoats grama, little bluestem, sand dropseed, and alkali sacaton. An abundance of rubber rabbitbrush and cholla cactus are indicative of overgrazed range, which has developed primarily at the mouth of Canyon Largo.

The vegetation density varies throughout the WSA depending on moisture availability and slope steepness. The denser stands of ponderosa pine and pinyon/juniper woodlands are found in the bottomlands and along the lower slopes of the canyon. Some thick stands of ponderosa occur on the mesa tops in the southwest portion of the WSA. Where there are extremely steep slopes along Canyon Largo, Lagartija Creek, and feeder canyons, the land is barren or sparse of vegetation. The mesa tops support the more drought-resistant juniper, which can be found in relatively dense stands. The grasslands are interspersed among the juniper.

Although no record exists of past timber sales, residual ponderosa pine stumps on the southwestern mesa tops of the WSA indicates previous selective harvesting.

A vegetation type summary of the Sabinoso WSA is on file in the BLM Taos Resource Area Office and is available for inspection.

## Threatened and Endangered Plants

No threatened or endangered vegetation species have been identified in the WSA.

## WILDLIFE

Habitat in the Sabinoso WSA can be classified as a single type, the pinyon/juniper shrub. The northern area (extending from the Canadian River up Canyon Largo for 2 to 3 miles) has been extremely disrupted by overgrazing.



Most of the habitat within the WSA is generally in fair condition. Utilization approximations for several species include 50 percent or greater on cholla cactus, and 90 to 100 percent on mesquite; rubber rabbitbrush has been so denuded that photosynthesis is inhibited. The majority of this area is under private ownership, but WSA land adjacent to portions of unfenced private land suffers the same conditions of overgrazing as the private sections.

Habitat condition for foraging mammals is excellent in the southern portion of the WSA. Much greater forage availability and species diversity exist in the southern reaches of Canyon Olguin and Lagartija Creek than in the northern portion of the WSA.

Major game species include: mule deer, coyote, bobcat, grey fox, turkey, and mourning dove. The WSA has potential for providing good mule deer habitat, but BLM wildlife biologists have located surprisingly few mule deer.

The WSA also potentially supports two introduced species not native to New Mexico, the ibex and the Barbary sheep.

The WSA would appear potentially to have a high degree of use by birds of prey, especially cliffdwelling and nesting species. However, the only species observed during the nesting season have been the redtailed hawk and the American kestrel. No nests have been observed and very few whitewash areas exist along the cliff rocks.

A wide variety of passerine birds can be found in the WSA. The regions with the greatest density and diversity are the canyon bottoms and the rimrock areas, because these two locations usually provide the greatest structural diversity. Higher densities of these birds may also be found near by springs and other water locations adjacent to the WSA.

A taxonomic list of probable and potential species occurrence in the Sabinoso WSA is on file in the BLM Taos Resource Area Office.

#### Threatened and Endangered Animals

The only threatened or endangered species that potentially may be located within the Sabinoso WSA is the black-footed ferret (Mustela nigripes). However, this species' presence is highly unlikely as the habitat conditions to support adequate prairie dog populations are not present.

#### VISUAL RESOURCES

The canyon lands of the Sabinoso WSA provide a striking contrast to the surrounding rolling prairie. This contrast is amplified by the varying vegetation in the two different areas. Landscape colors are predominantly green, gray, and brown with some variations in the distant background. The overall feeling varies from one of isolation within the steep narrow canyons to vast openness above the canyon rims and on top of the mesas.

In accordance with wilderness interim management objectives, a Visual Resource Management (VRM) Class II has been assigned to the WSA. The Class II VRM rating denotes that any change in the basic elements of the landscape (form, line, color or texture) caused by a management activity should not be evident in the characteristic landscape. This classification is an interim classification while these lands are under study. The WSA had no previous VRM classification.

#### CULTURAL RESOURCES

The Sabinoso WSA has not been systematically surveyed. However, finds of artifacts in and near the WSA and the known archaeological record of northeastern New Mexico suggest that the WSA contains a high density of archaeological sites dating from the prehistoric PaleoIndian period through the historical period of homesteading and ranching.

#### AIR QUALITY

Air quality in the WSA is excellent. No significant sources of particulate or gaseous emissions exist within 30 miles of the WSA.



## SECTION 3

## EXISTING AND POTENTIAL USES

## MINERAL DEVELOPMENT

Energy Minerals

## Leasable

The Sabinoso WSA is located within the Cuervo Basin, which has been classified by the U.S. Geological Survey as prospectively valuable for oil and gas. Nearly all of the WSA is presently under lease for oil and gas, but no drilling has been reported within the WSA. The BLM Taos Resource Area's 1981 Mineral Resource Inventory (MRI) reported that only 6 wells were drilled within a radius of 25 miles from the WSA. None of the wells encountered hydrocarbons, including the three wells that were drilled deep enough to reach Precambrian strata. While it appears that there is a sufficiently thick sequence of sedimentary rocks exists (2,000 to 2,500 feet), and many of the WSA's formations are known to produce petroleum products elsewhere, the WSA does not seem to contain either favorable source or reserve strata. Consequently, the potential for petroleum products in the WSA is concluded to be low.

Because none of the strata found in the WSA are known to be significant sources of coal, and no occurrences or evidence of coal have been reported, the potential for the discovery of coal within the WSA is rated as very low.

## Locatable

In past years some uranium exploration occurred in and around the Sabinoso WSA, but no significant deposits were discovered. Activity has been presently limited to three mining claims located on October 1, 1981, in the eastern portion of the WSA (T. 17 N., R. 24 E., Section 19).

A difference of opinion exists concerning the uranium potential in the Sabinoso WSA. The BLM Taos MRI reported that several abnormally high concentrations of uranium (anomalies) were discovered in the Chinle Formation as a result of airborne and ground radiometric surveys. However, subsequent re-examination of several of the anomalies during a national evaluation revealed that the uranium occurrences were minor. The conclusion of this evaluation has been that the potential for the discovery of a valuable uranium deposit in the Sabinoso WSA (as well as the rest of northeast New Mexico) in the Chinle and Morrison Formations is very low.

Uranium assessments from the Energy Reserves Group (Albuquerque, New Mexico) have given the Chinle Formation a very high rating for uranium potential. Its conclusions seem to be based on exploration efforts and the fact that the Chinle Formation within the WSA is known to contain uranium.

The New Mexico Bureau of Mines recently (1982) conducted geologic and geochemical studies of the Sabinoso WSA that included the collecting of

samples for analysis. While the final results of the field study are not available at this time, preliminary contact with Bureau of Mines personnel indicates that, while uranium was found, its concentrations are not sufficiently great to be considered economic under present market conditions. However, it is their conclusion that the Sabinoso WSA possessed a fair to moderate potential for the discovery of uranium; this is also the conclusion of the Bureau of Land Management.

### Non-Energy Minerals

#### Leasable

No activity is occurring in the Sabinoso WSA for non-energy leasable minerals (phosphates, sodium, or potassium), and none is expected. While some 2,000 to 2,500 feet of sediments underlie the WSA, none of them are known to contain appreciable amounts of sodium, potassium or phosphate. In addition, the geologic environment is such that deposits of these minerals are not expected to be found. Consequently, the potential for the discovery of valuable deposits of non-energy leasable minerals is considered to be very low.

#### Locatable

While no appreciable exploration or development efforts are known to have occurred for non-energy locatable minerals in the WSA, several base metals (copper, lead, zinc, and manganese) are known to occur in the Chinle Formation, associated with uranium. The Atlantic Richfield Company has classified the Sabinoso WSA as having moderately high potential for the discovery of valuable locatable minerals, based on exploration activity and geologic familiarity with the area.

Because so little exploration for locatable minerals has taken place in the Sabinoso WSA, the New Mexico Bureau of Mines conducted a field study during 1982 to assess the potential for base metals. Samples were taken which indicated the presence of "red-bed" copper. However, this material is in insufficient concentration to warrant further exploration under present market conditions.

#### Salable

While the sedimentary sequence in the Sabinoso WSA is relatively thick (2,000 to 2,500 feet), it is too easily broken and too erosive to be considered a good source of aggregate. In addition, the general region contains a considerable source of aggregate (Tertiary gravels) in more convenient locations to satisfy any future needs. Consequently, the potential for salable minerals in the WSA is considered to be very low.

### WATERSHED

No watershed developments exist in the Sabinoso WSA, and no plans have been made for watershed treatment in the future within the WSA boundaries.



## LIVESTOCK GRAZING

Nine grazing allotments overlap the Sabinoso WSA; these are shown on Map G-3. Table G-1 is a summary of the existing livestock use within the WSA.

Grazing is entirely by cattle in a yearlong use period. The majority of allotments are fully stocked and have cow-calf operations.

Several range improvements exist in the WSA (refer to Map G-3). The majority of improvements are allotment boundary fences, stock tanks, and trails that require maintenance on a periodic basis. Access to these improvements is primarily cross-country, utilizing unmaintained trails. Most improvement maintenance must be performed on horseback except in the southern region, which is accessible by vehicle.

Potential range improvements within the WSA include thinning of pinyon/juniper woodlands and reseeding with palatable forbs and grasses. More fencelines and stock tanks may also be considered as potential improvements.

## FOREST PRODUCTS

Within the Sabinoso WSA, approximately 130 acres of ponderosa pine exist (with 20,000 board feet of potential commercial timber), and 1,000 acres of pinyon/juniper (with the potential of 3,000 cords of wood for fuelwood use). No forest products in the WSA are under contract or permit use. The cutting of trees for home fuelwood takes place illegally.

In order to enhance the productivity and regeneration of existing stands of ponderosa pine, selective thinning practices should be applied. Thinning would include extensive pinyon and juniper removal from among the ponderosa stands.

TABLE G-1  
ALLOTMENT SUMMARY

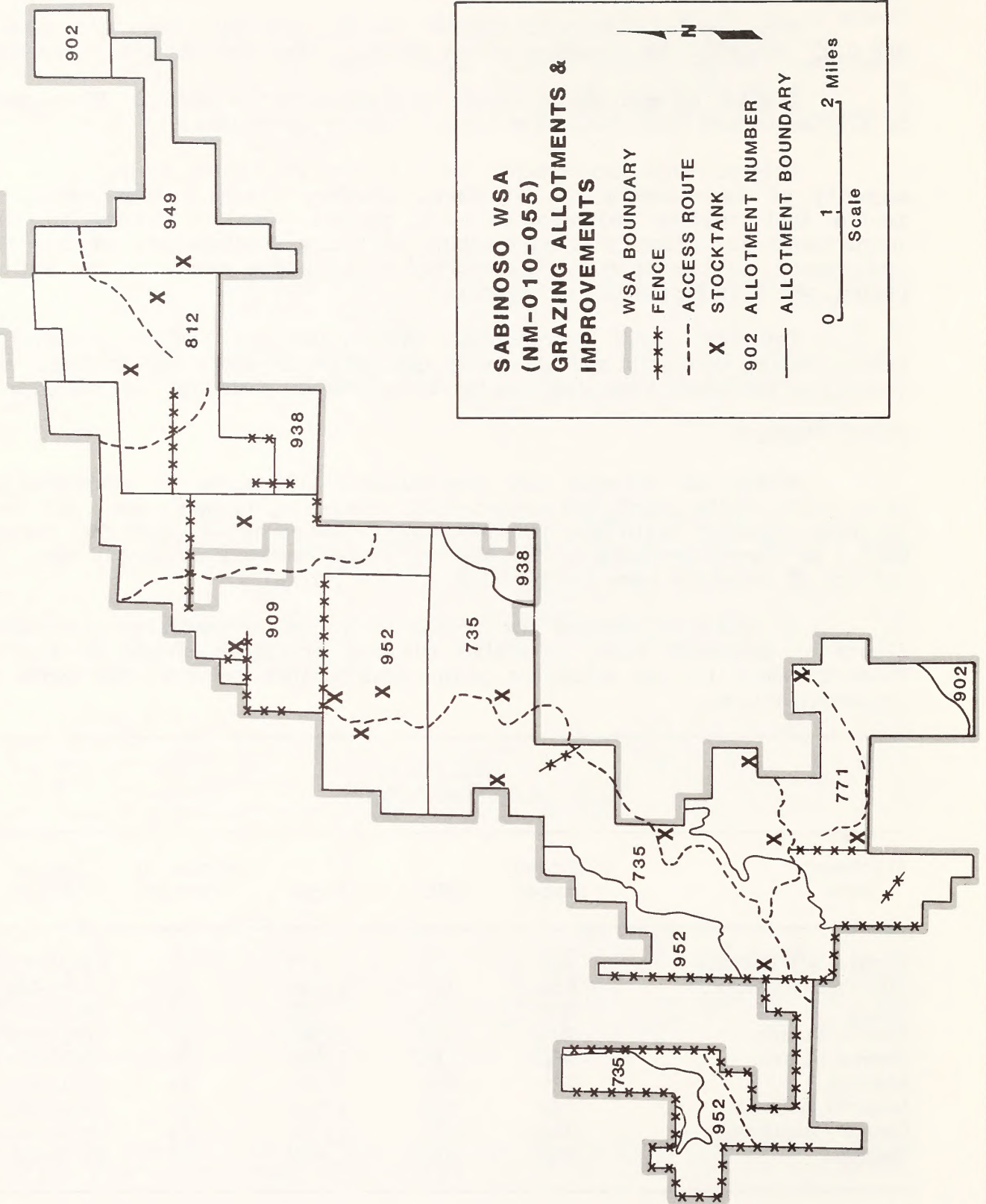
Allotment Name	Allotment Number	AUMs	Acres	Number of Cattle	Season of Use
Arroyo Del Mesteno	902	112	615	9	03/01-02/28
Sabinoso Squeeze	812	168	1,840	20	06/15-10/15
Upton	938	149	851	12	03/01-02/28
Canyon Vivian	909	189	2,782	16	03/01-02/28
Canyon Olguin	952	165	1,479	14	03/01-02/28
Rimrock	735	870	4,781	73	03/01-02/28
Lagartija Creek	771	380	1,710	69	10/01-02/28
Canyon Sabinoso	949	256	1,405	21	03/01-02-28
Canyon	736	165	1,479	14	03/01-02/28
TOTALS		2,454	16,942	248	

Source: Allotment files, BLM Taos Resource Area Office.

R23E | R24E

R22E | R23E

T17N  
T16N



MAP G-3



## RECREATION

Very little known recreation activity occurs within this remote WSA. Local ranchers frequent the Largo Canyon on horseback, and some ORV use occurs where vehicle access is available. No fishing use occurs because no fisheries habitat is available; hunting is also limited by the rugged terrain. Additional information on the hunting pressure and success rates for New Mexico Game and Fish Department's Game Management Unit Number 42, which includes the Sabinoso WSA, is on file at the BLM Taos Resource Area Office.

Recreation use may be increased if legal access to the WSA is obtained, because visitors could enter the Sabinoso WSA without trespassing on private land.

## NATIVE AMERICAN USES

No areas of religious significance to Native Americans are known to be located within the WSA.

## REALTY ACTIONS

No rights-of-way, withdrawals, easements, or permits are associated with the Sabinoso WSA. However, a 320-acre parcel of private land exists within the boundaries of the WSA (refer to Map G-1). Reasonable access to this parcel must be provided.

## WILDLIFE

Increase in potential use of the Sabinoso WSA by large mammals could be obtained through improvement of wildlife habitat, including vegetation manipulation and additional water sources. Vegetation manipulation would take place at the northern end of the WSA to improve forage. Catchments could provide added water sources. No wildlife habitat management plan has been prepared to date.





## SECTION 4

## WILDERNESS CRITERIA

## EVALUATION OF WILDERNESS VALUES

Quality of Mandatory Wilderness Characteristics

## Naturalness

The Sabinoso WSA consists of vast open expanses and rugged canyons that create a feeling of overall naturalness in the area (refer to Figures 1 through 4). Broad vistas are common as the visitor looks out from mesa tops over the rolling prairie. The lack of many human impacts within the WSA accentuates its natural appearance. However, the poor condition of the vegetation in the northern part of the WSA (the result of overgrazing on the intermingled public and private lands) affects the feeling of naturalness in that area.

The WSA is mostly inaccessible to motor vehicles, which has resulted in fewer human impacts (powerlines, residential or commercial development) than would normally occur within such a large expanse of land. The man-made structures and human activities that appear within and surrounding the WSA are screened by vegetation and topography. Man's evidence of intrusion, mainly trails and range improvements, are limited by the rugged country.

## Solitude

Outstanding opportunities for solitude exist in this vast, open canyon area. The isolation of the WSA from any large population areas and the few vehicular access points into the WSA have naturally restricted the number of people who visit it. The rugged canyons and areas of dense vegetation also enhance the feeling of being alone for any hiker or horseback rider.

If legal access to the WSA were obtained across private land the WSA would be accessible to more visitors, reducing the experience of solitude. Wilderness designation itself through public attraction may produce similar reductions to this particular wilderness value.

## Opportunities for Primitive and Unconfined Recreation

Recreational opportunities in the Sabinoso WSA include hiking, camping, horseback riding, and hunting. These opportunities are somewhat limited due to access and water problems. An increase in opportunities for this type of recreation would most likely occur if the BLM acquired legal public access to the Sabinoso WSA as part of wilderness management policies. When travelling along topographic features, it is nearly impossible for the visitor not to cross private lands. This adversely affects the quality of the recreational experience for visitors attempting to stay within the WSA boundary.

Recreation opportunities are also limited to some degree by the lack of water sources. Some stock catchments retain water after heavy rains, and ephemeral drainages also flow following rains, but more often no dependable



Figure 1 - View of Canyon Olguin from the southwestern end of the Sabinoso WSA. Note the ephemeral drainage on the canyon bottom.



Figure 2 - Lagartija Creek, located on the southeast end of the Sabinoso WSA, is also an ephemeral water source.





Figure 4 - View from atop a mesa on the southeastern boundary of the WSA overlooking the eastern plains of New Mexico.

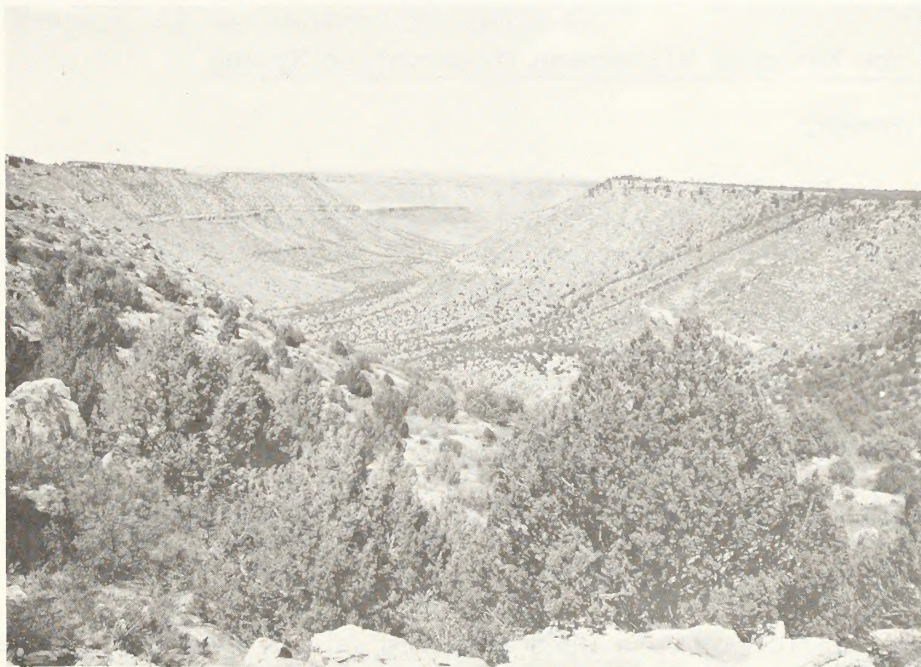


Figure 3 - View of Canyon Largo from atop a mesa at the northern end of the Sabinoso WSA.



water sources are available. All water must be carried in for human and animal consumption. The extreme ruggedness and remoteness of the WSA makes it a very dangerous place to be without water.

### Special Features

The most obvious special features of the Sabinoso WSA are its geology and topography. The location of a large, deep canyon area surrounded by the wide-open eastern New Mexico plains is unique to this region. The deep incisions cut into the flat topography by Canyon Olguin, Canyon Largo, and Lagartija Creek create a significant topographical and geological impact in this open expanse of hundreds of square miles of rolling prairies and mesa tops. The canyons expose geological displays of stratified rock, could serve as a teaching aid for earth history students if they can reach the area.

Another feature of the Sabinoso WSA is its scenic vistas. From atop the mesas in the WSA are excellent viewing opportunities for hikers and sightseers.

### Multiple Resource Benefits

The Sabinoso WSA contains many natural values that are part of its undisturbed character. However, no unusual or special resources exist that would benefit more by wilderness designation than by non-wilderness management.

### Diversity in the National Wilderness Preservation System

#### Ecotypes Present

Ecotypes/landform diversity has been analyzed using the Bailey-Kuchler system to classify the potential natural vegetation occurring in the Sabinoso WSA. According to this system, the potential natural vegetation of the Sabinoso WSA consists of 6,700 acres of conifer forests and pinyon/juniper woodlands, 7,160 acres of midland grasses, and 1,900 acres of barren land. The large acreage of barren land is attributable to the steep rocky cliffs of the canyons.

#### Distance from Major Population Centers

The WSA is within 3 hours' driving time of Albuquerque, New Mexico.

### MANAGEABILITY

After public comments were received on the Draft EA, a reassessment was made of the manageability of the Sabinoso WSA as wilderness. Serious manageability problems are anticipated under wilderness designation.

The primary considerations for effective wilderness management of this WSA are: the configuration of the WSA boundary, the boundary's relationship to topographic features and land status, and legal access. The land status in the Sabinoso WSA is a mosaic of private and state lands interspersed with public land. The WSA boundary is very irregular; several "necks" of public land surrounded by state and private land exist. It is



nearly impossible to travel along topographic features, such as canyons or ridges, without crossing private lands, because the land pattern does not conform with the topographic features.

Primary vehicular access to the WSA is available through private land, Canyon Olguin, and Lagartija Creek, but all the private routes have located gates. Private landowners surrounding the WSA oppose providing any legal access across their lands. Easements or right-of-way would have to be obtained to guarantee visitor access to the WSA if it were designated as wilderness.

The BLM cannot reasonably manage the Sabinoso WSA to preserve its wilderness characteristics over the long-term unless all of the following actions are implemented:

1. Acquire certain State of New Mexico and private land sections adjacent to the WSA, that would help create a WSA boundary conforming to the topographic features.
2. Obtain an easement or access right-of-way into the WSA.
3. Mark the WSA boundary with signs.

The BLM has analyzed other potential boundary configurations, but none were found to alleviate all the management problems.





## SECTION 5

## PUBLIC INVOLVEMENT OVERVIEW

Public involvement regarding the Sabinoso WSA has continued throughout the Taos Resource Area Roadless Study and resulting WSA recommendation. Two open houses were held to gather public input; the first was in Taos, New Mexico on April 26, 1983, and the second in Albuquerque, New Mexico on April 28, 1982.

During the public comment period on the Albuquerque District Wilderness Draft Environmental Assessment (USDI, BLM 1983), 26 inputs were received regarding the Sabinoso WSA. Of these, 19 inputs favored wilderness designation for the WSA. The comments noted the need for protection of this unique natural area, the significance of the area as a representative of the high plains upland ecotype, the excellent opportunities for solitude and recreation, and the spectacular scenery. They also discussed the possibility of the BLM acquiring inholdings and access. The State Land Office mentioned that wilderness status would not conflict with any land uses in the state sections.

Seven inputs opposing wilderness designation included several petitions containing a total of 91 signatures. Almost all the people signing the petitions were residents located near the Sabinoso WSA. Some comments identified the irregular shape of the WSA (which could lead to trespass of private property by recreationists), the requirement to provide reasonable access to inholdings, and the reluctance of private landowners to provide access as manageability problems. These comments expressed concern that the lack of water and the rugged nature of the topography make the WSA a dangerous place for visitors. The fear that wilderness designation would place restrictions on livestock operators was also mentioned. Another fear expressed was that wilderness designation would attract more visitors, thus reducing the WSA's privacy while increasing litter, trespass, and vandalism. The commentators also were concerned that a criminal element would be attracted to the WSA.

Some comments complained that the wilderness process was not well - publicized, nor was enough information on the process available to the public.

Several comments were also received that opposed designation due to the potential value of the WSA for mineral development. The lack of mineral exploration was cited as a reason to recommend multiple use of the WSA rather than wilderness designation. Another resource conflict was perceived to exist between wilderness management and habitat management for exotic wildlife species (ibex and Barbary sheep).

Some specific comments pointed out that the county roads mentioned on page F-1 of the Draft EA are actually private roads. These comments also stated that the road shown on Map F-2 of the Draft EA as SMC Road C51A is also a private road. The true location of SMC Road C51A is in the Area of Trujillo, New Mexico; Map F-2 was in error.

The commentors mentioned the cadastral survey completed in 1970 inaccurate. The original corner-sections from the 1880s were located; they do not agree with the 1970 survey corner-sections.

The picture of the old homesteads on page F-8 was identifiable by a commentor as being outside the WSA. The roads shown in Map F-3 were reported to be in extremely poor condition; they should be considered trails. These comments have been analyzed by the BLM, and corrections made to the text and maps.

Other coment letters were received that made general comments on the Sabinoso WSA. These comments indicated little interest in the proposal or expressed no objection for or against designation. These comments were primarily from state and federal agencies.



## SECTION 6

## ALTERNATIVES AND IMPACTS

This section discusses two alternatives for the Sabinoso WSA: the All Wilderness Alternative, and the No Action Alternative (manage under the existing land use plan). The BLM has also analyzed alternative boundary configurations for the WSA, but none were found to alleviate all the management problems.

## ALL WILDERNESS ALTERNATIVE

Under this alternative, the entire 15,760 acres of public land within the Sabinoso WSA would be recommended as suitable for wilderness designation. If designated as wilderness, existing and potential uses would be regulated by the BLM's Wilderness Management Policy (1981).

Impacts on Wilderness

Under the All Wilderness Alternative, the wilderness values existing in the Sabinoso WSA would benefit significantly from the added long-term protection of congressional designation.

Impacts on Minerals

Wilderness designation would limit mineral exploration and development. However, this impact is judged to be low based upon existing information which shows little chance of commercial mineral development.

Impacts on Other Resources and Uses

The impacts on soils, vegetation, and visual resources under this alternative would not be significant. Therefore, these resources are not included in the following discussions.

## Watershed

The watershed within the Sabinoso WSA is currently stable. Designation of this WSA as wilderness would maintain the watershed in its current condition through prevention of any major surface disturbance.

## Wildlife

This WSA currently has a high degree of wildlife habitat privacy. Wilderness designation may lessen this attribute or preserve it, depending on the demand and use of the WSA by recreationists. No wildlife habitat actions are planned that would be impacted by this alternative.

## Cultural Resources

Designation of the Sabinoso WSA as wilderness would minimize impacts on cultural sites through protective management and restriction of vehicular access.

### Livestock Grazing

The livestock grazing operations within the Sabinoso WSA may be impacted if the entire WSA is designated as wilderness. These effects would result from the inconvenience associated with a prohibition on vehicle access to the WSA. Limitations on vehicular use, maintenance, and construction of new range improvements would decrease the flexibility of the livestock operators. Reasonable vehicle access would be maintained to the private inholding in the WSA. No plans are proposed for vegetation manipulation within the WSA, so the impacts on this aspect of livestock grazing are expected to be low.

### Forest Products

The All Wilderness Alternative would prevent the potential timber harvest of 20,000 board feet of ponderosa pine and 3,000 cords of pinyon/juniper. However, the very limited access and steep rugged terrain on which these products are located limit the potential for harvest. No plans exist for the harvest of forest products in the WSA, so the impact of this alternative is expected to be low.

### Recreation

This alternative would help maintain the undisturbed character of the Sabinoso WSA. Legal access would need to be made available if the WSA was designated as wilderness.

The seclusion currently offered by this WSA could be adversely impacted by increased use as a result of increased public awareness and legal access. The present hunter use patterns would not be altered because the difficulty of access already limits hunting use primarily to horseback. Therefore, the impact of wilderness designation on recreation use is not expected to be significant.

### NO ACTION ALTERNATIVE

Under this alternative, the entire 15,760 acres of the Sabinoso WSA would be recommended nonsuitable for wilderness designation. If the WSA is not designated wilderness, existing and potential uses would continue, and the WSA would be dropped from management under the Interim Management Policy and Guidelines for Lands Under Wilderness Review (USDI, BLM 1979).

### Impacts on Wilderness Values

The wilderness values and special features of the Sabinoso WSA would not be provided long-term protection through Congressional action. Management of the WSA would be subject to change in the long term.

### Impacts on Minerals

No impacts to minerals are expected under this alternative, because exploration for minerals could continue and the opportunity for development is available.



Impacts on Other Resources and Uses

NO ACTION

No significant impacts would occur to vegetation, visual resources, soils and cultural resources; therefore the discussion under this alternative has been omitted.

Watershed

Under the No Action Alternative, the existing watershed conditions would be maintained. The isolation and rough terrain of the WSA limit any impacts on watershed by restricting surface-disturbing activities.

Wildlife

No impacts on wildlife would occur within the WSA under this alternative, because limited use and resource development the WSA is likely to occur.

Livestock Grazing

No impacts would occur to livestock grazing operations under this alternative, because use adjustments, additional costs, and restrictions on range improvements are not expected to occur.

Forest Products

The No Action Alternative would not greatly impact forest products in the Sabinoso WSA. Although an estimated 20,000 board feet of commercial timber and 3,000 cords of fuelwood have been identified, the problems of legal access and rough terrain make the potential for harvesting these products low and the cost high.

Recreation

This alternative would not greatly impact recreation in the Sabinoso WSA. Lack of easy access would continue, thereby limiting the opportunities for recreation use.





# APPENDIX H

WILDERNESS ANALYSIS REPORT

SAN ANTONIO WILDERNESS STUDY AREA

NM-010-035  
ALBUQUERQUE DISTRICT

TAOS RESOURCE AREA

SAN ANTONIO







## SECTION 1

### GENERAL DESCRIPTION

#### LOCATION

The San Antonio WSA is located in Taos County, New Mexico. It lies northwest of San Antonio Mountain, approximately 6 miles southwest of Antonito, Colorado, and 12 miles north of Tres Piedras, New Mexico (Map H-1). The total WSA is included on a single U.S. Geological Survey (USGS) topographical map--the Los Pinos quadrangle.

#### CLIMATE AND TOPOGRAPHY

The WSA is composed of broad, gently rolling sagebrush and grass plains bisected north to south by the 200-foot-deep Rio San Antonio Canyon. The WSA ranges in elevation from 7,900 feet (2,633 meters) to 8,835 feet (2,945 meters).

The mean annual temperature for the San Antonio Mountain region is 44° F (6.6° C). The average annual temperature ranges from 80° F (27° C) during the summer months to 8° F (-13° C) in winter. July is usually the warmest month and January the coldest. Cold air drainage along Rio San Antonio Canyon may result in local differences in temperature; the canyon bottom may occasionally have temperatures lower than what is normally recorded for the general area.

The first killing frost occurs around September 20th. Frost conditions can usually be expected to remain until May 30th, resulting in an average of 120 frost-free days.

Annual precipitation ranges from 12 to 15 inches (31 to 38 centimeters) at the south end of the WSA to 9 inches (20 centimeters) in the north. Precipitation is a result of both snowpack and seasonal rainfall. Winds are primarily from the south and southwest.

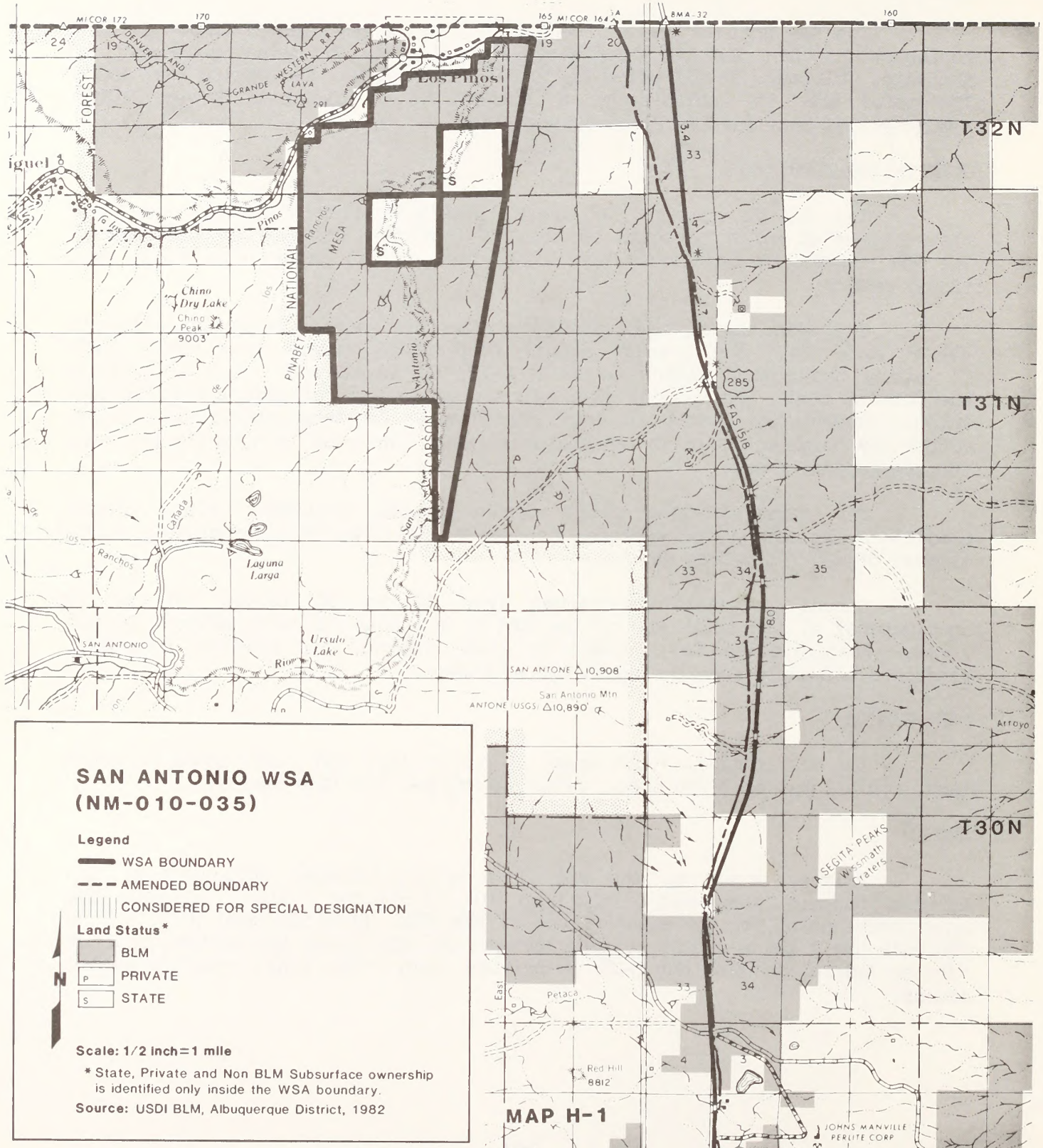
#### LAND STATUS

The WSA contains 7,050 acres of public land and 1,280 acres of state land, for a total of 8,330 acres (refer to Map H-1 for land status).

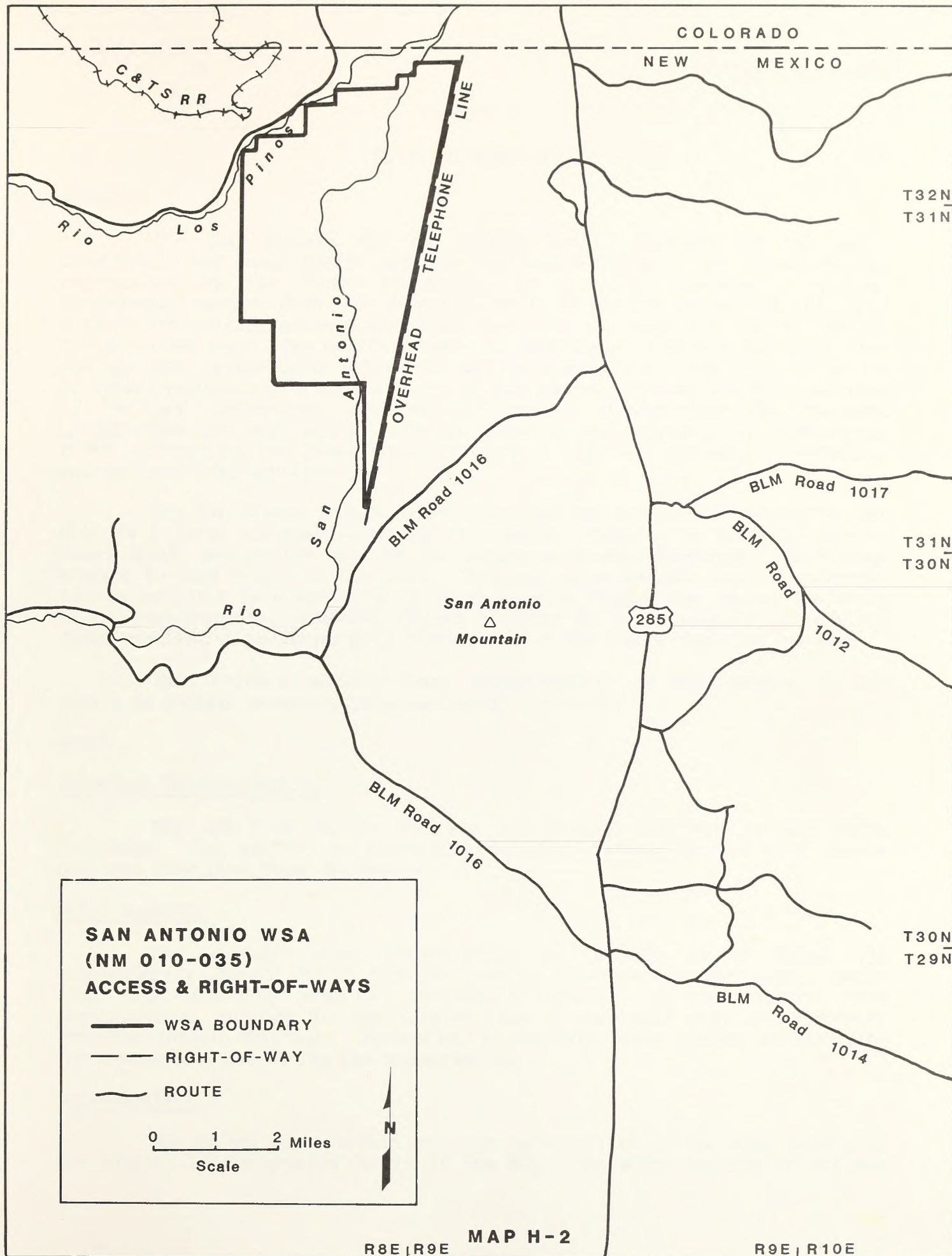
#### ACCESS

Primary access to the WSA is from U.S. Highway 285 north of San Antonio Mountain, then west on BLM Road 1016 (dirt) for 3 miles. This is the only access point for the southern end of the WSA. From BLM Road 1016, a dirt vehicle trail leads north, cutting through the WSA along the eastern side of Rio San Antonio Canyon (Map H-2) on private land. This trail provides public access.













## SECTION 2

## EXISTING RESOURCES

## GEOLOGY

The San Antonio WSA is located within portions of two major structures, the Tusas Uplift and the Rio Grande Trough. The Tusas Uplift, represented by the Tusas Mountains, is a large northwest trending, structurally complex arch that comprises about 20 percent of the WSA and forms a structural divide between the Chama Basin to the west and the Rio Grande trough to the east. The uplift appears to have begun in Middle Paleozoic time and has been tectonically active off and on ever since. Its greatest period of uplift resulted in a central core of Precambrian crystalline rock, mantled by Tertiary sedimentary and volcanic rocks. Within the WSA, volcanic pyroclastics and high energy alluvial deposits rest directly on Precambrian rocks, indicating the Tusas Mountains were a highland throughout Cretaceous and earliest Tertiary times.

The Rio Grande Trough, which occupies the eastern 80 percent of the WSA, is a large northeast-trending rift valley, bounded on the west by the Tusas Uplift and on the east by the Sangre de Cristo Mountains. The trough appears to have formed in the middle Tertiary, when crustal and/or subcrustal tension resulted in a series of parallel tension faults that caused the crust to be down-dropped. Tensional forces resulted in an outpouring of Tertiary flood basalts, which essentially blanket all of the trough found in the WSA.

The Tertiary volcanic rock characteristic of this region is not likely to contain preserved paleontological resources.

## WATER

Watershed Characteristics

The WSA lies within the Rio San Antonio and Rio de los Pinos drainages. The surface is generally composed of flat terrain with little overland flow into these drainages.

Water Quantity

The average annual precipitation in the WSA is 14 inches (36 centimeters). Runoff is 0.5 inch per year (1.3 centimeters per year), mostly from high-intensity rainfall events. Recharge occurs rapidly from precipitation, and the Rio San Antonio flow is generally east and northeast from San Antonio Mountain. Streamflow is variable, with limited availability for consumptive use during the summer months.

Water Quality

Due to the flat terrain and high permeability of the soil underlying the basalt, little erosion occurs in the WSA. The water quality of the Rio

San Antonio is unknown, but should be good to excellent based on watershed characteristics.

### Ground Water Availability

The WSA is located in the Rio Grande Underground Water Basin. The main aquifer is contoured with the Santa Fe Group of andesite-basalt lava. The water table is estimated to be near the 7,500-foot level, with recharge occurring rapidly from San Antonio Mountain, to the west, and surface precipitation and seepage from Rio San Antonio.

Water quality should be excellent with total dissolved solids of less than 500 parts per million. Yield varies with the permeability of the basalt, but should be adequate for domestic and livestock use.

### SOILS

Soils in the WSA are susceptible to both wind and water erosion, and deteriorate rapidly with continued vehicular use. The soil types consist of the following.

The Travelers-Luhon-Stunner Association is composed of shallow to deep soils on nearly level to moderately sloping topography. In this WSA, Travelers soils are shallow, with an underlying base of basalt. Surface textures are stony, cobbly, or gravelly loam.

The Raton-Rock Outcrop-Orejas Association occurs on the basalt foothills of San Antonio Mountain. These soils form a shallow layer over the basalt base, on slopes that are strongly sloping to steep. This association is cobbly and stony throughout.

The Eutroboralfs-Haplobololls Association includes soils that are developing on moderately sloping to steep mountain sideslopes, ridges, and/or mesa tops. These soils form a shallow to moderately deep layer over tuff pumice or rhyolites. Textures range from sandy loam to clay loam.

Slopes in the WSA range from 2 percent to 50 percent with the depth to bedrock ranging from 10 to 60 inches. Permeability (inches per hour) ranges from 0.06-0.6 to 2.0-6.0, with a water-holding capacity (inches/inches) of 0.06-0.09 to 0.17-0.21. Salinity is generally less than four.

### VEGETATION

Two major vegetation types exist in the WSA. Approximately 95 percent of the WSA is rolling upland with sagebrush-type vegetation. The remaining 5 percent is a canyon/riparian type with considerable diversity of vegetation.

The rolling upland consists of flat to gently rolling topography with a consistent 700-foot elevation drop from south to north. The gradient drop is approximately 100 feet per mile. The southwest corner of the WSA has slightly more elevation drop, and is dissected by small drainages with sparsely scattered evergreens. The major plant species found in the



rolling upland are sagebrush, broom snakeweed, winterfat, and several varieties of grasses such as blue grama and western wheatgrass.

The Rio San Antonio flows through a narrow gorge from south to north, bisecting the WSA. The canyon walls vary from cliffs to large boulders with areas of shallow soil deposits. There is considerable diversity in vegetation throughout the canyon. Vertical diversity can be seen from the rim to the streambed. Aspect diversity is obvious due to the considerable amount of meandering of the stream and the resulting exposures. Species composition also varies with the overall elevation drop as the river flows northward.

The canyon walls consist primarily of conifer woodlands. The major woodland species are pinyon pine, Rocky Mountain juniper, and Douglas fir.

Lying adjacent to the Rio San Antonio is a riparian woodland. Trees associated with this intermittent stream include cottonwood, willow, and boxelder. Understory shrubs include snowberry, golden currant, gooseberry, and mountain mahogany. Various grass species are found along the riparian zone, including side-oats grama, pinyon ricegrass, Indian ricegrass, Kentucky bluegrass, bottlebrush squirreltail, western wheatgrass, and blue grama. (For further information on vegetation associations in the San Antonio WSA, contact the BLM Taos Resource Area Office.)

#### Threatened and Endangered Plants

No threatened or endangered plants are presently recognized as being indigenous to this locality or are known to occur within the WSA.

#### WILDLIFE

Many faunal species occur in this WSA because of the juxtapositional influences of nearby forest lands, and the presence of a very diverse but narrow canyon that bisects the WSA. (A species/occurrence list of faunal species that either reside or frequent the WSA is on file at the BLM Taos Resource Area Office.)

The San Antonio Mountain and Atencio Wildlife Habitat Improvement Areas are located within the WSA. These areas have been reseeded for the benefit of both range and wildlife (refer to Figures 1 and 2).

The rolling upland (sagebrush) vegetation type supports such small game species as the Nuttall's cottontail, the white-tailed jack rabbit, and the coyote. Pronghorn antelope is the single most important big-game species. The region is also utilized as a hunting ground by various species of raptors.

Important animal species that utilize the riparian zone are the bobcat and the grey fox. The mountain lion may also frequent this portion of the WSA. Various species of raptors utilize the canyon for nesting sites. A diverse number of passerine birds also inhabit the gorge. Due to intermittent flows, the Rio San Antonio does not support a game fishery.



Figure 1 - The San Antonio Mountain Range and Wildlife Area which includes a portion of the WSA.



Figure 2 - The Atencio Wildlife Habitat Improvement Area located at the southern end of the San Antonio WSA. The view to the northwest is of the rim of the Rio San Antonio Canyon.



## Threatened and Endangered Animals

The New Mexico Department of Game and Fish states that nine threatened or endangered species could possibly occur in Taos County. Of the species listed, the only animals likely to frequent the WSA that have reportedly been sighted are the bald eagle (Haliaeetus leucocephalus), the osprey (Pandion haliaetus), and the peregrine falcon (Falco peregrinus).

## VISUAL RESOURCES

The San Antonio Scenic Quality Rating Unit is rated as VRM classes II and III. The topographic relief is divided into two distinct types: (1) flat open plain, and (2) the river canyons of the Rio de Los Pinos and the Rio San Antonio.

Vegetation varies from riparian habitat in the river canyons to dry sagebrush and pinyon-juniper in the flat open plain. Landscape colors are predominantly green, gray, and brown with some variations in the distant backgrounds. The overall feeling is one of open expanses, contrasted by the deep incisions in the flat plains produced by the two river canyons that abruptly drop out of sight.

The Class II rating for the river canyon areas denotes that any change in the basic elements (form, line, color, or texture) caused by a management activity should not be evident in the characteristic landscape. The Class III rating for the open plains area indicates that changes in the basic elements caused by the management activity may be evident, but should remain subordinate to the visual strength of the existing character. (However, the entire WSA is being managed during the wilderness review process as a Class II due to the non-impairment criteria.)

## CULTURAL RESOURCES

The quantity and type of cultural resources in the WSA are not known because the WSA has not been surveyed. BLM personnel have noted non-diagnostic lithics of both local and exotic materials along the river, as well as discarded tin cans throughout the WSA. Historic sheepherding camps consisting of basalt wall alignments exist, but no standing structures are known within the WSA.

The density of cultural resources in the WSA is expected to be low. The range of types of cultural resources that may be present includes archeological manifestations of PaleoIndian campsites (about B.C. 9500 to B.C. 5500, to A.D. 400), Anasazi campsites (about 400 to 1400 A.D.), Comanche and Apache campsites from the 17th, 18th, and 19th centuries, and sheepherder campsites from the 19th and 20th centuries. Individual sites will have to be evaluated when they are located.

## AIR QUALITY

Air quality in the WSA is generally good. Winds are primarily from the south and southwest. Some pollution from scoria mining operations on the northeast side of San Antonio Mountain, occurs when the scoria dust is lifted by strong winds.





## SECTION 3

## EXISTING AND POTENTIAL USES

## MINERAL DEVELOPMENT

Energy Minerals

## Leasable

The U.S. Geological Survey has included the far western portion of the San Antonio WSA within the Los Pinos Oil and Gas District as prospectively valuable for oil and gas. This is a broad classification, however, and the Taos Resource Area's Minerals Resource Inventory (Contract No. YA-553-CTO-1088, 1981) indicates a lack of favorable reservoir rocks, which would seem to preclude the formation and/or retention of petroleum in this specific location.

## Locatable

Sporadic uranium exploration has occurred in the general vicinity of the WSA (although outside its boundaries), but no discoveries were made. While the possibility of finding uranium exists within the WSA, the lack of favorable host rocks - e.g., Mesozoic, early Cenozoic Sandstones, or granitic intrusions - would seem to preclude its discovery. However, more detailed information is needed to confirm this conclusion.

Non-Energy Minerals

## Leasable

Alunite ( $KAl_3(SO_4)_2(OH)_6$ ) may occur within the WSA because the mineral is known to occur in volcanic rocks. However, more detailed geologic and geochemical data is needed before an evaluation of the potential for the discovery or development of alunite can be made.

Since virtually all other non-energy leasable minerals are found in sedimentary deposits and the WSA contains a very thin sedimentary sequence, the potential for the discovery and/or development of these types of deposits appears to be very low. The lack of interest in these minerals would seem to confirm this conclusion.

## Locatable

Because the Precambrian rocks that make up the core of the Tusas Mountains are complex and highly metamorphosed, there is a possibility of a massive sulfide (e.g., copper, lead, zinc, molybdenum) occurrence within or near the WSA. Because exploration activity has taken place, more data is required before an evaluation of the potential for the occurrence of massive sulfides can be made.

The fact that flood basalts are generally not known to contain appreciable amounts of metallic minerals, as well as the apparent lack of

major hydrothermal alteration zones or granitic intrusions, would seem to preclude the occurrence and development of metallic mineral deposits.

Non-metallic deposits are not expected to occur in basaltic deposits. Consequently, the potential for the occurrence of any significant locatable mineral deposits, other than massive sulfides, is considered to be low.

### Salable

Because the San Antonio WSA is essentially all Tertiary flood basalt, with perhaps some basaltic cinder cones, the potential for the development of salable mineral deposits other than cinders (scoria) and crushed rock is considered to be low.

### WATERSHED

Sources of water for wildlife and livestock within the boundaries of the WSA are limited to several catchments and the intermittent flows of the Rio San Antonio.

### LIVESTOCK GRAZING

#### Allotments

Within the San Antonio WSA are four allotments (Map H-3). All are cattle allotments except Allotment 646, which has a dual sheep-cattle permit. The primary season of use is spring-fall. Any revision of grazing periods would stress primarily fall-winter use. (Refer to Table H-1 for more information.)

TABLE H-1


#### ALLOTMENT SUMMARY

Allotment Number	Allotment Acres	AUMs	WSA Acres	WSA AUMs	Percent of AUMs in WSA
583	4,852	426	2,380	219	51
584	3,375	445	1,570	220	49
632	1,870	140	1,870	140	100
646	4,343	<u>446</u>	<u>1,230</u>	<u>126</u>	28
TOTALS		1,457	7,050	705	

Source: Allotment files, BLM Taos Resource Area Office.




**SAN ANTONIO WSA**  
**(NM-010-035)**  
**GRAZING ALLOTMENTS & IMPROVEMENTS**

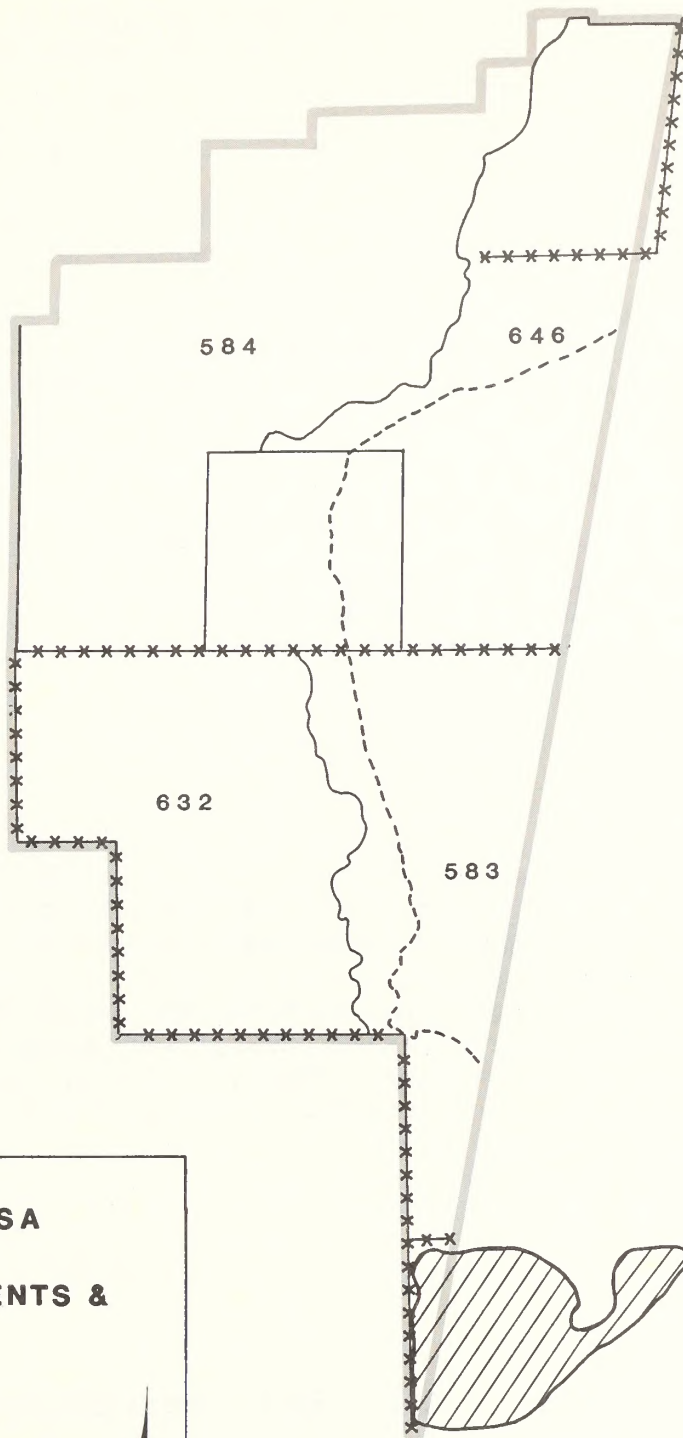
- WSA BOUNDARY
- \*\*\* FENCE
- VEHICULAR TRAIL
-  SEEDING
- 632 ALLOTMENT NUMBER
- ALLOTMENT BOUNDARY

01/21

Miles

Scale





MAP H-3

Allotments 646 and 583 are currently included in Allotment Management Plans that are in need of revision. The revisions are primarily due to changes in livestock operator control.

#### Range Improvements

A number of range improvements exist in the WSA (Map H-3). Most of them are allotment boundary fences that require maintenance on an annual basis.

Access to these improvements is primarily by off-road travel utilizing no established roads. The livestock operators occasionally need heavy equipment to maintain stock tanks and livestock trails, but this is rare.

#### Potential Improvements

Specific projects have not yet been proposed for this WSA. However, water developments may be proposed in the form of well and catchment installations for livestock and wildlife use.

#### FOREST PRODUCTS

No timber harvest or vegetative sales areas exist in the WSA.

#### RECREATION

Very little recreation activity occurs in the San Antonio WSA. The activity that does occur includes ORV use and hiking in the river canyons. Fishing is minimal due to the ephemeral nature of the Rio San Antonio.

San Antonio Mountain, adjacent to and south of the WSA, receives heavy use by hunters during elk, deer, and antelope hunting seasons. (Additional information on hunting pressure, harvest, and success in the Tres Piedras Management Unit, which includes the WSA, is available at the BLM Taos Resource Area Office.)

#### EDUCATION/RESEARCH

No research or education areas exist in the WSA.

#### NATIVE AMERICAN USES

No current use of the WSA by native Americans is known at this time.

#### REALTY ACTIONS

The only right-of-way present in the WSA is along the eastern boundary and is for a telephone line (Map H-2). No withdrawals, easements, or permits exist within the WSA.



## WILDLIFE

A wide variety of uses by wildlife occur within the WSA. Only those uses of significant value or interest are discussed here. The primary uses are by big game, birds of prey, and predators. The WSA includes portions of the San Antonio Mountain and Atencio Wildlife Improvement Areas.

### Big Game

Virtually all of the WSA can be considered yearlong habitat for pronghorn antelope. Herd numbers vary between 40 and 120 as the animals travel into and out of the WSA.

About 50 percent of the WSA is an extremely important elk wintering ground and migration route. Little or no use by elk occurs in the summer months or in the northeastern portion of the WSA.

The gorge and southwest corner of the WSA can be considered year-round deer habitat. It is probably used more heavily during the winter months. The Rio San Antonio and the small drainages to the west provide most of the cover and browse for deer in the WSA.

### Birds of Prey

A wide variety of birds of prey frequent this WSA. The most important use is for nesting in the canyon by American kestrels, prairie falcons, and red-tailed hawks.

The canyon has not been extensively inventoried, so other species may use this location. The undisturbed nature of the canyon provides an excellent location for prairie falcons to raise their young. Other probable nesters include the Cooper's hawk and the great horned owl.

### Predators

Coyotes and gray fox are the primary fur-bearers using the WSA. The extent of trapping is not known. It is likely that the southern portion of the WSA may be frequented by mountain lion.





## SECTION 4

## WILDERNESS CRITERIA

## EVALUATION OF WILDERNESS VALUES

Quality of Mandatory Wilderness Characteristics

## Naturalness

The San Antonio WSA is natural in its general appearance. The Rio San Antonio Canyon is the single most important factor in the feeling of naturalness for the area (refer to Figures 3 and 4). The views and impressions below the canyon rim are influenced by the natural screening of the canyon walls and the lush riparian vegetation. This contrasts with the vast open expanse above the canyon rims where impacts of human activities are more visible (these include range improvements, vehicular routes, a scoria mining operation, and utility lines.)

The 7,050-acre San Antonio WSA contains approximately 6 miles of vehicular routes that are used primarily for access to range improvements requiring maintenance on an annual basis, and for access to the state inholdings. Physical access to Rio San Antonio Canyon is also provided by these routes for recreational use.

A scoria mining operation is located 2 1/2 miles southeast of the WSA, and is particularly noticeable above the canyon rim when winds raise the light red and black dust at the mine site.

The most noticeable human impact is the telephone line which extends for the entire 7-mile eastern boundary of the WSA. The line is only visible, however, from above the Rio San Antonio Canyon rim.

The cumulative effects of these impacts is minimal when viewed from below the Rio San Antonio Canyon rim. Above the canyon rims, wide open space allows more human impacts in and adjacent to the WSA to be visible. The amount and degree of impacts present do not appreciably reduce the naturalness of the WSA.

## Solitude

The size, general lack of screening from vegetation and terrain, proximity to U.S. Forest Service recreation use areas (for hunting and camping) and to rural residential areas to the north diminish the opportunities for solitude in this WSA.

Opportunities for solitude are greatest in the area of the WSA below the Rio San Antonio Canyon. Access to the canyon is limited, so fewer encounters with humans are made. Above the canyon rims, more human activity is encountered due to the closeness of U.S. Highway 285, ORV access to U.S. Forest Service recreational lands, and ranch activity in the WSA.

These intrusions on solitude are mitigated in the canyon by the vegetative and topographic screening which allows the user to find seclusion.



Figure 3 - View from Rio San Antonio Canyon looking southeast at San Antonio Mountain.



Figure 4 - The Rio San Antonio flows through the canyon from October through June. Irrigational diversions upstream dry up the creek during the summer months.



## Opportunities for Primitive and Unconfined Recreation

Opportunities for primitive and unconfined recreation activities are limited in the WSA due to its small size and location near human activities. Recreational opportunities include elk, muledeer, and antelope hunting in the vicinity of San Antonio Mountain, located 2 miles south of the WSA. Hiking and camping are potential activities in Rio San Antonio Canyon, but fishing is affected by the ephemeral nature of the stream.

### Special Features

The ephemeral waters of the Rio San Antonio and the topographic contrast of the canyon cutting through the open plains make up the WSA's most outstanding special features. The viewing of wildlife that frequent the Rio San Antonio during the flow season (October through June) also makes the WSA important, although the actual wildlife habitat areas are concentrated on San Antonio Mountain on U.S. Forest Service lands.

The scenic value of the riparian vegetation in the canyon, which contrast with the dry open sagebrush plain located above and around the canyon rim, may be considered a special feature.

### Multiple Resource Benefits

The San Antonio WSA contains a wealth of natural values as a result of its relatively undisturbed character. Congressional designation as wilderness would carry the weight of law and would provide a greater degree of long term protection for these natural values than would administrative designations available to the BLM.

### Diversity in the National Wilderness Preservation System

Ecotype/landform diversity has been analyzed using the Bailey-Kuchler system in order to classify the potential natural vegetation expected to occur in the San Antonio WSA. The potential natural vegetation of the WSA consists of 5,000 acres of midland shrubs, 2,000 acres of midland grasslands, and less than 1,000 acres of conifer forests and pinyon/juniper woodlands.

### Distance from Major Population Centers

The WSA is within a day's drive of Albuquerque, New Mexico. Albuquerque is identified in the 1980 census as a Standard Metropolitan Statistical Area.

## MANAGEABILITY

An analysis of the manageability of the San Antonio WSA as wilderness must include consideration of state lands within the WSA boundaries, legal and physical access, rights-of-way, uses of adjacent private and U.S. Forest Service lands, and topography.

Surface inholdings include 1,280 acres of State of New Mexico lands. The primary ingress and egress points for the WSA pass through these state sections (Map H-1), so reasonable access is available to these inholdings.

The flat, open terrain of the WSA allows for almost unlimited access by ORVs from adjacent U.S. Forest Service lands, where hunter pressure is very high. Upon designation, the entire WSA would need to be fenced and signed to prevent ORV access, because topography does not provide a natural barrier. Limiting access in this manner would be expensive and difficult to enforce because cutting the fence would be very easy.

The WSA appears to have low potential for mineral development, so private or state mineral rights would not likely create incompatible uses in the WSA.

"Grandfathered" rights in the WSA are associated with livestock operations and maintenance of range improvements. All existing livestock operations may continue in the same manner and degree as in the past.

Boundary adjustments would not enhance wilderness manageability of the WSA. The lack of topographical barriers to vehicular travel, combined with poorly defined natural boundaries, could create trespass problems as the result of existing use patterns of hunters and ORV users in the area. Public education and increased levels of patrol could be expected to reduce, but not eliminate, these access and use problems.



## SECTION 5

## PUBLIC INVOLVEMENT OVERVIEW

Public involvement in the wilderness review process was gained during review of the Rio Grande Management Framework Plan (1979), input during the Taos Resource Area Roadless Study and the WSA recommendation phase, and in the establishment of the Off-Road Vehicle Designation Plan which included the San Antonio WSA. Two open houses were held for public input regarding the San Antonio WSA and other WSAs, in the statewide study. One was held in Albuquerque, New Mexico on April 28, 1983, and the other in Taos, New Mexico on April 26, 1983.

During the public comment period on the Albuquerque District Wilderness Draft Environmental Assessment (March 1983), 15 public inputs were received on the San Antonio WSA. Most of these inputs favored wilderness designation of the area. These comments were of a general nature and were based primarily on the remote location of the San Antonio River Canyon in an otherwise wide-open plain area.

Those who expressed support for wilderness designation discussed the need for a natural habitat for antelope and other game. This need is increased because of the WSA's close proximity to the San Antonio Mountain Range and Wildlife Management Area (where use by motor vehicles is limited). Support for wilderness was also based on the need to preserve the WSA's characteristic western wheatgrass range and high rolling grasslands, which are considered under-represented in the National Wilderness Preservation System.

Four inputs opposed designation. Those opposed to the potential designation of the San Antonio WSA as wilderness expressed concern for public land becoming unavailable to ORV users, hunters, and mineral development, and for increasing the restrictions on livestock grazing within a designated wilderness area.

It was also expressed that the WSA does not meet "wilderness specifications", and that protection could be afforded by monitoring ORV use and designation as an Area of Critical Environmental Concern.

These comments presented no new perspectives or information regarding the wilderness characteristics of the WSA that would cause a change in the BLM's evaluation and proposal for non-wilderness status of the San Antonio WSA.





## SECTION 6

## ALTERNATIVES AND IMPACTS

This section discusses two alternatives for the San Antonio WSA: the All Wilderness Alternative, and the No Action Alternative (manage under the existing land use plan). The BLM has also considered other alternatives for this WSA which were not found to be reasonable or beneficial; therefore, these alternatives were dropped.

## ALL WILDERNESS ALTERNATIVE

Under this alternative, the entire 7,050 acres of public land within the San Antonio WSA would be recommended as suitable for wilderness designation.

If the San Antonio WSA is designated as wilderness, the existing uses and activities and potential uses (identified in Section 3 of this document) would be managed under the constraints of the Wilderness Management Policy (USDI, BLM 1981).

Under the All Wilderness Alternative, the wilderness values present in the WSA would benefit significantly from the added long-term protection of Congressional designation.

Impacts on Minerals

While the San Antonio WSA appears to have a low potential for mineral development, the possibility exists that minerals could be found. Designating the entire WSA as wilderness would prevent any large-scale exploration efforts. Any energy or non-energy minerals that might be within the WSA would remain undiscovered and unused.

Impacts on Other Resources and Uses

## Watershed

No major impacts affecting the surface and ground water within the WSA are foreseen. Under wilderness designation, treatment of the watershed would be restricted to nonmotorized equipment. Prevention of surface disturbance by vehicles would reduce soil compaction, thus improving infiltration rates and decreasing surface run-off.

## Wildlife

The impacts to wildlife associated with the All Wilderness Alternative would primarily be improvement of habitat privacy. The species that would benefit most is the pronghorn antelope.

## Cultural Resources

Designating the entire San Antonio WSA as wilderness would protect any cultural resources that may be present. Limitations on excavation and stabilization would be in effect, but the BLM State Director has approval authority on a case-by-case basis. Therefore, the impact of wilderness designation on the cultural resources in this WSA would not be significant.

## Livestock Grazing

Wilderness designation would allow existing grazing operations to continue, but new range developments would only be allowed if they did not degrade wilderness values. Since existing operations are "grandfathered" and no new developments are currently planned for construction, no significant impact would occur to livestock grazing under the All Wilderness Alternative.

## Recreation

The All Wilderness Alternative would enhance some recreation activities such as hiking and backpacking, but would restrict recreation activities that require motorized vehicles. The present hunter use patterns would also be altered under wilderness management due to the restriction on vehicular access.

## NO ACTION ALTERNATIVE

Under the No Action Alternative, which would recommend the entire WSA as nonsuitable for wilderness designation, management would continue in accordance with the existing Rio Grande Management Framework Plan, the ongoing Taos Resource Management Plan, and the ORV Designation Plan for the area. Those existing and potential uses (refer to Section 3 of this appendix) would continue under this alternative, after the WSA was removed from restrictions of the Interim Management Policy and Guidelines for Land Under Wilderness Review (1983).

## Impacts on Wilderness

Nondesignation would not significantly impair the wilderness values of the WSA. These wilderness values are considered marginal so the impact to them is expected to be minimal under this alternative. Also, a low potential for mineral development exists, and no other significant uses have been identified that would result in the introduction of man-made features or the modification of the natural character of the WSA.

## Impacts on Minerals

Although the potential is considered low, mineral exploration and development could occur.



## Impacts on Other Resources and Uses

### Watershed

No significant changes in watershed conditions would occur as a result of the No Action Alternative.

### Wildlife

The No Action Alternative would not have significant impacts on wildlife. No actions identified in the BLM's land use planning would disturb Rio San Antonio Canyon.

### Cultural Resources

Because the San Antonio WSA is in an area where off-road vehicle use is restricted to one existing road, the No Action Alternative would not seriously affect cultural resources.

### Livestock Grazing

No impacts to livestock grazing are expected to occur as a result of this alternative. All rangeland improvements could be checked and maintained on a convenience basis using motorized equipment.

### Recreation

This alternative would not impact the present recreation activities taking place, because little change from the existing conditions is expected. ORV use is restricted to existing routes, with no cross-country vehicle use allowed.





# GLOSSARY





## GLOSSARY

AGRARIAN. Of land or land tenure; of agricultural groups and their welfare.

ALLUVIAL AQUIFER. An aquifer that consists of stream-deposited, unconsolidated clay, silt, sand, and gravel.

ALLUVIAL CHANNEL. The central part of a streambed, in this instance formed on unconsolidated valley fill deposits.

ANASAZI. A cultural stage associated with the development of an agricultural economy (ca. A.D. 450-1350 in the central San Juan Basin). This stage encompasses Basketmaker Periods (characterized by basketry and pithouse villages) and Pueblo Periods (characterized by pottery and villages of solid masonry construction).

ANIMAL UNIT (AU). Considered to be one mature (1,000 lb.) cow or its equivalent based upon average daily forage consumption of 26 pounds of dry matter per day.

ANIMAL UNIT MONTH (AUM). The amount of forage required to sustain the equivalent of one cow, one horse, two elk, three Barbary sheep, five domestic sheep, five goats, five deer, or ten antelope for one month.

AQUIFER. A rock unit that contains water and is permeable enough to transmit this water to wells and springs.

ARCHAIC. A cultural stage of mobile, small-game hunter/gatherers (ca. 5500 B.C.-A.D. 450 in the central San Juan Basin).

AREA OF CRITICAL ENVIRONMENTAL CONCERN (ACEC). An area within the public lands where special management attention is required (when such areas are developed or used, or where no development is required) to protect the area and prevent irreparable damage to important wilderness, cultural, recreational, paleontological, or scenic values, fish and wildlife resources, or other natural systems or processes, or to protect life and safety from natural hazards.

ARROYO. The flat-floored channel of an ephemeral stream, commonly with very steep to vertical banks cut in alluvium. Regional southwest term for wash.

ARTESIAN CONDITIONS. Ground water that is under sufficient pressure (always greater than atmospheric) to rise above the top of the aquifer containing it. This ground water does not necessarily rise to or above the land surface. Artesian is synonymous with confined.

ARTESIAN PRESSURE. Ground water under sufficient pressure to cause the water level in a drilled hole to rise above the top of the rock unit.

ARTIFACT. An object produced or shaped by human workmanship.

BEDROCK AQUIFER. An aquifer that consists of consolidated material.



BRITISH THERMAL UNIT (Btu). The heat needed to raise one pound of water 1° F. A Btu is equal to 252 calories.

CHACOAN OUTLIERS. More than 70 prehistoric pueblo communities connected by a system of roads and visual communication into a sophisticated socioeconomic complex centering on the Chaco Culture National Historical Park (ca. A.D. 828-1178).

CULTURAL RESOURCE DATA. Cultural resource information embodied in material remains and manifested in studies, notes, records, diaries, analyses, and published and unpublished manuscripts.

CULTURAL RESOURCE INVENTORY CLASSES. Class I - existing data inventory - an inventory study of a defined area designed (1) to provide a narrative overview (cultural resource overview) derived from existing cultural resource information, and (2) to provide a compilation of existing cultural resource site record system. Class II - sampling field inventory - a sample-oriented field inventory designed to locate and record, from surface and exposed profile indications, all cultural resource sites within a portion of a defined area in manner which will allow an objective estimate of the nature and distribution of cultural resources in the entire defined area. The Class II inventory is a tool to be utilized in management and planning activities as an accurate predictor of cultural resources in the area of consideration. The primary area of consideration for the implementation of a Class II inventory is a planning unit. The secondary area is a specific project in which an intensive field inventory (Class III) is not practical or not necessary. Class III - intensive field inventory - an intensive field inventory designed to locate and record, from surface and exposed profile indications, all cultural resource sites within a specified area. Upon completion of such inventories in an area, no further cultural resource inventory work normally is needed. A Class III inventory is appropriate on small project areas, all areas to be disturbed, and primary cultural resource areas.

CULTURAL RESOURCE MANAGEMENT. The development and implementation of programs designed to inventory, evaluate, protect, preserve, and/or make beneficial use of cultural resources (including evidence of prehistoric, historic, and recent remains) and the natural resources that figures significantly in cultural systems. The objective of such programs is the conservation, preservation, and protection of cultural values through management, and the scientific study of these resources for the public good.

COMPONENT. The manifestation of any given cultural episode in the history of a locality or a region. Sites containing the residue to a single episode of habitation or other group activity are referred to a single component sites. A site with more than one episode of occupations is referred to as a multicomponent site.

CUESTA. Used in the southwestern U.S. for a sloping plain which is terminated on one side by a steep slope.

CYSTS. A subsurface storage vault usually lined with fire hardened clay. Ranging from a gallon or so in size to some over 6 feet in depth and 2-4 feet wide. Usually located in proximity to living areas and food processing areas. Frequently used as burial crypts.



DISCRETIONARY LEASING. Leasing of certain resources at the discretion of the Bureau.

ECOTYPE. An existing plant community with distinguishable characteristics described in terms of the dominant vegetation present (as per Bailey-Kuchler).

EPHEMERAL ARROYO (INTERMITTENT STREAM). A stream or reach of a stream, that flows only in direct response to precipitation. It receives no long-continued supply from melting snow or other source, and its channel is at all times above the water table.

ESCARPMENT. A steep face terminating high lands abruptly.

EVAPOTRANSPIRATION. A collective term meaning the loss of water to the atmosphere from both evaporation and transpiration by vegetation.

FIRE RINGS. A primitive fireplace which consists of stones placed in a small circle on or in the ground.

FORESTRY. Class 1 - Juvenile - Below 12 inches diameter; seedlings, saplings, and poles. Age ranging between 20-80 years. Class 2 - Blackjack Class - Trees have dark bark; relatively short, rapidly tapering bole, a pointed or rounded top, and ascending upper branches. Vigorous growth. Class 3 - Intermediate Age Class - Bark turning from black to yellow or brown. Boles are longer and less tapering than those blackjacks of the same diameter. Growth almost as vigorous as blackjack. Class 4 - Yellow Pine Class - 200 to 300 years old. Reddish yellow or cinnamon brown bark on all sides of the bole (trunk). Large trees.

GRANDFATHERED USES. Means the "continuation of existing mining and grazing uses and mineral leasing in the manner and degree in which the same was being conducted on October 21, 1976.

GULLY EROSION. Erosion of soil or soft rock material by running water that forms distinct narrow channels that are 1 square foot or more in cross-section and that usually carry water only during and immediately after heavy rains or following the rapid melting of ice or snow.

HEMITRYPA. A bryozoan of Silurian to Mississippian age having a fine network superstructure on the obverse side and supported by spines along the carinae.

INSTANT STUDY AREAS. All primitive or natural areas formally identified by the BLM prior to November 1, 1975. Such areas were included in Section 603 of the Federal Land Policy and Management Act to be studied for wilderness suitability and recommended to the President in much the same way as Wilderness Study Areas are studied and recommended.

LEASABLE MINERALS. Minerals such as coal, oil shale, oil and gas, potash, sodium, sulphur in New Mexico and Louisiana, silica deposits in certain parts of Nevada, geothermal resources and all other minerals that may be acquired under the Mineral Leasing Act of 1920, as amended.



LOCATABLE MINERALS. Minerals that may be acquired under the Mining Law, as amended.

MCCARTYS SYNCLINE. A north northeast trending fold in rocks, originating in the vicinity of McCartys, NM and terminating in the Ignacio Chavez Land Grant, in which the strata dip inward from both sides toward an axis.

OSTRACON. A small bivalved animal inhabiting both salt and fresh water. These crustaceans have lived since Ordovician time and have shells which are molted with growth.

PUBLIC LAND. Any land and interest in land owned by the United States and administered by the Secretary of the Interior through the Bureau of Land Management, without regard to how the United States acquired ownership, except:

- lands located on the Outer Continental Shelf;
- land held for the benefit of Indians, Aleuts, and Eskimos; and
- lands in which the United States retains the minerals, but the surface is private.

PIPING. The formation of underground channels that result in gullies and sinkholes.

RANGE SITE. A distinctive kind of rangeland that differs from other kinds of rangeland in its ability to produce a characteristic natural plant community. It is capable of supporting a native plant community typified by an association of species that differs from that of other range sites in the kind of proportion of species or in total production.

RANGE IMPROVEMENT. Any facility or structure built for livestock grazing and designed to control patterns of use, provide water, and stabilize soil and water conditions.

RILL EROSION. The development of a channel or channels with less than 1 square foot cross-section, initiated by numerous irregularities in the ground surface and resulting in the uneven removal of surface soil by running water that is concentrated in streamlets of sufficient volume and velocity to generate cutting power. It may be an intermediate process between sheet erosion and gully erosion.

RECREATION MANAGEMENT AREA. Sub-units of Resource Areas that serve as basic land units for recreation management. Each area is identified and managed as a unit based on similar or interdependent recreation values, homogenous or interrelated recreation use, land tenure and use patterns, or administrative efficiency.

SALEABLE MINERALS. Minerals such as common varieties of sand, stone, gravel, cinders, pumice, pumicite and clay that may be acquired under the Minerals Act of 1947, as amended.

SHEET EROSION. Erosion in which thin layers of surface material are gradually removed from sloping land by storm runoff in minute, numerous, and localized pulses of running water flowing overland rather than by streams flowing in well-defined channels.



STANDARD METROPOLITAN STATISTICAL AREAS (SMSA). A county containing at least one city of 50,000 inhabitants or more, plus as many adjacent counties as are metropolitan in character and are socially integrated with that central city or cities.

SUBHORIZONTAL. Approximating the horizontal.

SUPPLEMENTAL VALUES. Those features that include "ecological, geological, or other features of scientific, educational, scenic, or hisorical value".

TRIBUTARY WATERSHED. A contributory watershed that flows into a larger one.

UNDERSTORY. Those trees and woody species growing under the upper or uppermost canopy layer.

UPLAND EROSION. Generally the wearing away of the land surface by running water, wind, ice, or other geologic agents including such processes as gravitational creep, detachment and movement of soil or rock by water, wind, ice or gravity. Includes rill, sheet and gully erosion.











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